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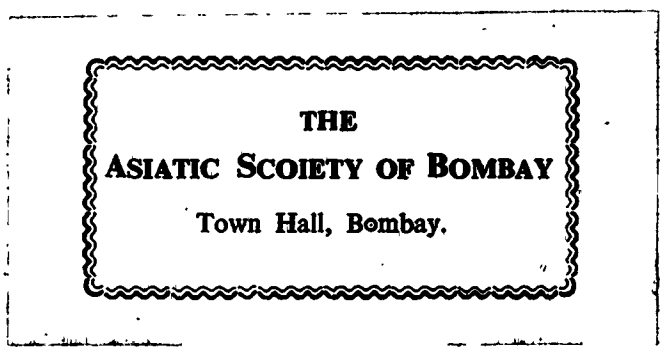

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REPORT

OF THE

BOMBAY PLAGUE COMMITTEE,

APPOINTED BY GOVERNMENT RESOLUTION No. 1204/720P,

THE ASIATIC SOCIETY OF BOMBAY LIBRARY

ON THE

PLAGUE IN BOMBAY,

FOR THE PERIOD EXTENDING FROM THE 1st JULY 1897 TO THE 30th APRIL 1898.

Under the Chairmanship of

Sir JAMES MacNABB CAMPBELL, K.C.I.E.

EXAMINED BY

CAPTAIN THE HON. R. MOSTYN, R.A.,

EXTRA SECRETARY, BOMBAY PLAGUE COMMITTEE.

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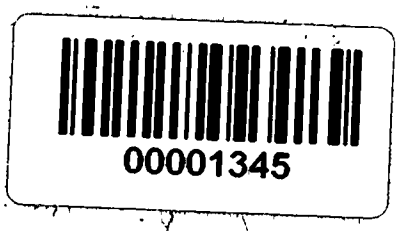

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INTRODUCTION.

The first epidemic began in August 1896. It reached its climax on January 19th, 1897, with a total death-rate for the month of 7,627, which fell in February to 6,732, to 5,436 in March, and, in spite of a serious renewal in Mandvi, to 4,578 in April, and to 2,331 in May. During June the total mortality was 2,308, which is only 174 in excess of the average of the five previous years. But taking into account the estimated decline in population from the previous average of 850,000 to an actual strength of about 750,000, the June returns show a comparative excess of 462 deaths, or of 17 per cent.

Two main features of the Plague history of the hot-weather months (March–June) of 1897 were (1st) the activity and thoroughness with which, under the direction of Brigadier-General Gatacre, the waning epidemic was dealt with by the fresh and powerful organisation of the Plague Committee; and (2nd) the special difficulty with which that body had to deal in the arrival in Bombay of, perhaps, 250,000 to 300,000 immigrants during the months of April, May and June.

With the 30th of June, at which date the Report presented by General Gatacre closes, the Plague had been almost extinguished. The City, however, was crowded with the destitute immigrants above alluded to from the mofussil, most of them in search of work. Labour was scarce, and the price of grain very high. Thus, many houses which had been declared unfit for habitation were unavoidably re-occupied. It is not surprising, then, that, in spite of the extinction of the Plague for the time being, an excessive mortality from all causes should have set in. The excess in the first week of June had been 40, which had sunk in the second week to 17, but had then risen through 36 to 84 in the fourth week.

The Report now presented covers the succeeding ten months, *viz.*, from July 1st, 1897, to April 1898.

The first chapter narrates the history of those ten months, detailing the progress of sickness and death, the movements of the people, the seasonal conditions, the difficulties encountered, and the measures introduced in each month. Succeeding chapters are devoted to each of the more important features or measures of the Committee's administration.

In the Appendices concise aspects or details of more or less importance are dealt with; a selection of orders, rules, circulars, &c., most of which are referred to in the volume of the Report are presented; the charts which accompany the Report are explained; and, finally, a list is given of the volunteer workers who responded to His Excellency the Governor's appeal to the City to take its preservation into its own keeping.

CHAPTER I.

MONTHLY SUMMARIES.

JULY 1897.

Staff.

THE chief difficulties of the early months under report (July—September) were connected with the staff. The urgent demand for Medical Officers on the North-West Frontier led to the removal of a large number of the Chief Officers in charge of districts of the City by whom, between March and June, the operations against the plague had been carried out. Famine pressure and the scarcity of officers prevented recruiting either from the Civil or the Military services. The nominal strength of the Medical Staff was maintained, but reduction was only avoided by substituting Assistant Surgeons for Covenanted Medical Officers, Hospital Assistants for Assistant Surgeons, and Medical Students for Hospital Assistants. This evil was to some extent removed in September by the arrival of the Medical Officers whose services had been engaged by the Secretary of State in England. Though most of these gentlemen had expected scientific hospital and laboratory employment rather than the purely administrative duties of house-searching and disinfecting, they with few exceptions worked with vigour and success. The services of Drs. Castellote, Gibson, Haydon and Hunt have been of the greatest value to Bombay. At the same time it could not be expected that gentlemen to whom the language and the people were strange could fill the place of Covenanted Medical Officers with many years' special training and knowledge of the people.

During the months of July and August the main duties of the Plague Staff, in which several members of the Committee took an active share, were the ascertaining and removal to hospital of cases of cholera and

plague, the disinfecting of the tainted houses, the destruction (due compensation being allowed) of infected clothes and bedding, and the supervision of hospitals. Cases were too few to necessitate a rigid house-to-house visitation. But parties, consisting of a Medical Officer, an Inspector or a Sub-Inspector, a lampman, a lockman, and one or two peons, searched houses where there was information or suspicion of a case of plague or cholera. Partly because during the rainy season camping was not feasible, and partly from the small number of attacks, the work of disinfecting was limited to the cleansing of rooms where cases had occurred. Except that when a case was sent to the hospital one of the family accompanied the patient as an attendant, no segregation of Contacts, that is, of the members of the family or others who live in the sick-room, was enforced.

Type of disease. The type of disease was generally bubonic, occasionally pneumonic, and occasionally choleraic. The duration of fatal attacks was seldom under seven days. Mild cases were not uncommon which recovered under home treatment, and did not infect other members of the family.

Rainfall. The rainfall in June had been sufficient, with a fairly distributed total of 13·85 inches. This favourable distribution of rain continued during July, the first week showing 1·49 inches, the second 7·90, the third 10·65, and the fourth 8·94—a total fall of 28·98 inches.

Rainfall, June 1897.

First	Week	2·48
Second	„	5·07
Third	„	5·39
Fourth	„	0·91

Sickness and Mortality. During July, so far as recorded plague cases were an index, health continued to improve. On the 11th July, with a total mortality not much above normal, the Plague returns by the Municipal authorities for the first time showed attacks 0, deaths 0. During the next week the registered number of Plague deaths continued extremely small, no deaths being returned either on the 17th or 18th. The total mortality, however, was less satisfactory. The returns for the 19th July showed 117 deaths —higher than any daily total registered since the middle of April. Of 678 deaths recorded during the week ending July 20th, the bulk were returned as due to debility, remittent fever and unknown causes. Cholera also appeared in the monthly returns, with 15 fatal cases in the first, and 34 fatal cases in the second week of July. Numbers of beggars and impoverished labourers continued to find their way into Bombay, and by the end of July cholera had made a serious advance, the deaths recorded during the last week of the month from this cause alone amounting to 84. The outbreak was most severe in Madanpura—a low-lying, dirty, ill-drained and badly-built quarter of Byculla,

chiefly inhabited by the North Indian Mahomedan hand-loom weavers, called Julahas.

Movements of the people.

				Excess.
JULY...	*Arrivals*—			
	Rail	102,058		
	Road	87,313		
	Sea	10,893		
			200,264	
	Departures—			
	Rail	111,105		
	Road	81,188		
	Sea	11,979		
			204,272	4,008

AUGUST.

Rainfall.

During August the rainfall was 15·59 inches, and was well distributed. The returns were during the first week 2·22 inches, during the second 6·52, during the third 5·24, during the fourth 1·30, and during the fifth ·31.

Sickness and mortality.

Cholera rose to 220 during the first week of August, but then steadily and rapidly fell to 173, 143, 117 and 76.

The registered deaths from Plague were few. The weekly totals are for the four weeks of July ;—7, 4, 9, 14, and for the five weeks of August ;—18, 6, 21, 13, 25. During this epidemic all cases of cholera, so far as regards the removal of the sick to hospital and the disinfecting of the house or room and of the drains and latrines, were treated as cases of Plague. It is not possible to determine whether cases of Plague with symptoms resembling cholera occurred in any considerable numbers. On the whole, the fact that cholera disappeared within the ordinary limit of a cholera epidemic favours the view that in the main the cholera epidemic was unconnected with Plague. The death-rate (per thousand a year) during the eight weeks of July and August shows a gradual rise from 34·99 in the first week of July to 65·61 in the first week of August, and then a steady fall to 48·29 during the last week of that month. Though, during the months of July and August, Plague was registered as causing only 117 deaths, yet the great rise in total mortality from a yearly rate per thousand of 34·99 during the week ending July 13th to 59·10 per thousand during the week ending

Week ending—	Total Deaths.	Death-rate on 1,000 a year.
July 13th	577	34·99
„ 20th	678	41·57
„ 27th	770	46·31
Aug. 3rd	1,071	65·61
„ 10th	965	59·10
„ 17th	978	52·52
„ 24th	866	51·73
„ 31st	814	49·29

August 10th, shewed a serious increase of general sickliness, much of which was probably due to Plague either ignorantly or intentionally concealed. During the month of August cases were noted in which enteric fever, remittent fever, and pneumonia passed into Plague. It is therefore probable that a considerable share of the cases returned during late July and early August under lung diseases and fevers should be assigned to Plague.

Relief works.

From the beginning of August complaints were general, and to some extent well-founded, that the city was infested with numbers of starved idlers whose feeble condition, predisposing to Plague, was a menace to public health. How far it was necessary or advisable to open special relief works was a somewhat difficult question. If liberal pay were offered and no task were exacted, crowds of indigents would be attracted, to the disturbance of the labour-market. As the extent of the distress was doubtful, and as the question of opening Municipal or State relief works was not easily determined, a subscription was started and a sum of Rs. 9,422 collected. The Secretary of the Indian Famine Charitable Relief Fund placed a further sum of Rs. 10,000 at the disposal of the Committee. Relief works consisting of filling in low land on the Ripon and Clark Roads, and of breaking stone into road-metal, were opened on the 3rd August. The merest subsistence rates, namely, three annas a day for men, two annas for women, and one and a half annas for children were paid; and by the close of the month 10,755 persons, of whom 8,770 were men, 1,952 women, and 33 children, had received relief. The enforcing of a labour test and the giving of a mere subsistence wage prevented the daily gathering of a rabble of loafers and avoided the evil of tempting the destitute from famine-stricken districts into Bombay.

Inward Quarantine—Sea.

As there was reason to believe that the spread of Plague in different parts of the city was due to the importation of cases by sea from Cutch and the South Konkan ports, and by land from the Deccan, attention was given to the completion of arrangements for inspecting and detaining new-comers. The serious outbreak of Plague in Mandvi (Cutch), which started in May 1897 and continued with great severity till July, was not a source of danger to Bombay till after the middle of August when, at the close of the stormy season, navigation opened and numbers of passengers, chiefly Hindu traders of the Bhatia, Lohana and Jain classes, began to arrive in Bombay. Though the epidemic was practically over in Mandvi, Plague was still active in the neighbouring villages. Cases of Plague

occurred on board of some of the steamers, and suspicious cases were detected at the medical examination in Bombay. To guard the city against re-infection, it was necessary to open camps in which arrivals from Cutch and Karachi might be detained for a period of 10 days. Narielwadi Hospital was enlarged and made into a Detention Camp. The local Bhatias, Jains, and Lohanas, to whom most of the immigrants belonged, made special arrangements for the camp comforts of members of their own communities; and the principle of a guarantee by certain leading members of each community, allowing under an adapted form the concession of surveillance accepted by the Venice Convention, together with the safeguard of photographing all who were passed out on surveillance, worked well. Care was taken that all clothes were spread in the sun. People of these classes have large quantities of clothes, among them many quilts and padded coverlets. How far the heat of the sun is enough to sterilise germs in heavily padded articles of clothing and bedding is doubtful. The use of the steam sterilisers which have since been obtained would have improved the original arrangements.

One difficulty in managing the camp was that the inmates, as a rule, were rich and tempted the camp staff to connive at breaches of the rules. On the whole, however, surveillance worked well, but required to be kept in check by the circular of the 20th October 1897.

Regulations for the management of Segregation Camps are given in the Appendix.

As large numbers of sickly and ill-nourished people were arriving from the Konkan by boat, it became necessary to detain them also. The hospital at Wari Bunder was through the kindness of the Hon'ble Mr. Hughes enlarged so as to include the Port Trust Hospital, and was made into a Segregation Camp to hold about 1,500 inmates.

Movements of the people.

				Excess.
August...	*Arrivals*—			
	Rail	113,646		
	Road	93,258		
	Sea	18,252		
			225,156	
	Departures—			
	Rail	130,105		
	Road	93,258		
	Sea	17,017		
			240,380	15,224

SEPTEMBER.

Rainfall. The September rainfall was both abundant and timely. Of a total of 20·49 inches, 2·06 fell during the first week, 7·83 during the second, 3·40 during the third, and 7·20 during the fourth.

Sickness and mortality. In the beginning of September (4th), though the public health was slightly improved, the total death-rate was still 50 per cent. above the normal. The second week (11th) showed a rise in the total mortality from 814 to 838, due partly to an increase in fever, partly to large Plague figures in Byculla, Parel, Mandvi, and Kamathipura. The third week showed a further rise in the total deaths from 838 to 876. The fourth week showed a slight decline.

In the beginning of the month the sections of the city where the death-rate was highest were (on the basis of a yearly rate per thousand) Second Nagpada 140·82, Tardeo 82·19, Parel 77·80, Kamathipura 73·00, and Byculla 61·43. Later, in all the divisions of the city where in 1896 Plague had been epidemic, the death-rate was especially high. The last week (25th) showed a slight decline, but, according to the returns, a spread of Plague, chiefly in isolated cases, over fourteen out of the thirty-two districts of the city.

The outbreak of Plague in Mandvi occurred chiefly in large well-built houses, to few of which on the score either of want of light or air could objection be taken. Some of the houses in which cases occurred had been attacked during the cold-weather epidemic. In many cases, probably in the majority, the attacks took place in houses which had escaped during the previous epidemic. In other districts the houses attacked were, as a rule, inferior chawls and tenements in which insanitary conditions and want of light and air were notable.

During the first week of September a severe outbreak of relapsing fever occurred. Ten cases were sent to Arthur Road Hospital, where before the end of the month more than 25 cases were under treatment. As in a considerable proportion of cases Plague was mixed with relapsing fever, the precautions of disinfection and isolation adopted in the case of Plague were extended to relapsing cases.

During September, while in Bombay the number of Plague cases was only 181, and of recorded Plague deaths 136, in the mofussil the corresponding totals were 3,886 cases and 2,888 deaths.

Relief works. The demand for relief, in spite of the labour test and the subsistence wage, continued to increase. But the result was satisfactory. Of the

crowd of idlers and beggars who attracted the public eye, the daily average number on the works was above 500.

During the month 10,702 men, 2,411 women and 1,920 children—a total of 15,033—received relief.

Staff.

Towards the close of September, in consequence of the increased mortality, Kamathipura, Tardeo, and Nagpada were put under a special organization under the charge of Surg.-Lieut. Walton, I.M.S. It was admitted that the supervising staff should have been at the same time strengthened in other affected parts. But in consequence of the drain of officers to the Frontier, and also of the outbreaks of Plague in Poona, Karhad in Satara, and Sholapur, no officers were available.

Inward Quarantine—Sea.

Towards the end of September, in consequence of the large number of arrivals from the Plague-infected districts of Satara and Poona, through Ratnagiri ports, quarantine was imposed on all arrivals from those ports. The pressure on Wari Bunder Camp was for a time excessive. It was relieved by the use on emergency of the pilgrim sheds at Malet Bunder, and on one or two occasions the pressure had to be lightened and room made for new-comers by allowing inmates of more than five days' standing to leave the camp. Still the pilgrim sheds were unsuited for ordinary arrivals, and reducing the term of detention proved an unsatisfactory device. It was accordingly determined to open a fresh Segregation Camp at Modikhana on open ground convenient to the bunders. The details of this camp, which is the most complete camp built by the Committee, are given in the chapter on camps. It has accommodation for 2,500 inmates.

Movements of the people.

				Excess.
SEPTEMBER ...	*Arrivals*—			
	Rail	123,526		
	Road	120,968		
	Sea	45,825		
			290,319	
	Departures—			
	Rail	150,885		
	Road	117,153		
	Sea	27,100		
			295,138	4,819

OCTOBER.

Rainfall.

The rainfall in October was short and ended before the middle of the month. Of a total of 2·62 inches, 2·52 inches fell during the first week and 10 cents during the second. After the middle of October no rain fell.

Sickness and mortality.

During the first half of October both the total death-rate and the recorded Plague deaths showed a decrease. This was followed,

during the second half of the month, by a considerable increase in recorded Plague. The cases, except in Kamathipura and Mandvi, were few compared with September, but the totals show an increase from 181 to 327, and in recorded Plague deaths from 136 to 223. Meanwhile, the mofussil epidemic of Plague spread with marked rapidity, the totals rising from 3,886 cases and 2,888 deaths in September to 6,970 cases and 5,021 deaths in October.

Relief works. Compared with September, the numbers on relief works showed a slight increase from 15,033 to 17,925, of whom 11,855 were men, 5,574 women, and 596 children.

Inward Quarantine—Land. The severity of the outbreaks of Plague at Surat, the continuance in Poona and Satara, and the specially fatal epidemic in Sholapur during the second half of September, convinced the Committee of the necessity of enforcing detention on arrivals both by rail and by road. The Chamber of Commerce was consulted. On October 1st, that body expressed their disapproval of the Committee's proposed extension of detention to land as well as to sea travellers, mainly on the ground of the damage which quarantine would inflict on the trade of Bombay by preventing the resort to it of up-country buyers. The Chamber was of opinion that increased police supervision might keep out many weak and emaciated arrivals; that a more effectual medical inspection would suffice; and that if necessary a camp for the weakly and suspicious might be started at Kalyan.

To this the Committee replied that the imposition of a few days' detention was not likely to cause such interference with trade as the Chamber dreaded; that practically a quarantine had been in force in Bombay for months, both against Karachi and Cutch; and that in the case of Calcutta strict land quarantine had not caused the evil effects described by the Chamber.

The Committee further argued that land or at least rail quarantine was more necessary than sea quarantine, as the length of time spent on a railway journey is generally less than on a sea voyage, and therefore in the case of arrivals by sea the chance of Plague showing itself before or on arrival was greater than in the case of passengers by rail; that since Plague does not show itself until after a period of incubation, no medical inspection on arrival can remove the risk of importation of Plague from infected areas; that Detention Camps at Kalyan and Bandora would be costly and difficult to manage from Bombay; and that it was doubtful whether Municipal funds could be spent outside of municipal limits.

Moreover it was urged that the existing system of lodging the healthy in camps in the city and of moving suspicious cases at once to Plague Hospitals appeared to be the best system; that a local adaptation of the system of surveillance sanctioned by the Venice Convention secured the required complement to inspection and prevented quarantine becoming too costly and burdensome as surveillance set free, after a delay of 24 hours, all arrivals pressed for time; and lastly, that the practice of photographing persons allowed out on surveillance prevented the risk of personation, and their attendance at the camp for medical inspection on the second and fourth day after being let out on surveillance minimised the risk of their carrying infection.

The Municipal Commissioner however (October 9th) demurred to the scheme, both on the ground of cost and that it was unlikely to produce any practical results.

On the 14th October, to prevent infected arrivals from Sholapur, orders were issued that railway passengers with Sholapur tickets should be strictly examined and that all third class passengers from Sholapur should be detained at Sion and sent in carts to the Narielwadi Camp.

On the 19th a telegram from Government ordered that booking of third class railway passengers from Surat and its neighbourhood to Bombay should be stopped. But the orders were evaded (1) by passengers booking second class, and (2) by passengers travelling down the line from Surat, and taking tickets for Bombay from Broach or other uninfected stations.

On the 5th November an important memorandum on the necessity of establishing quarantine for railway passengers was received from the Surgeon-General, and on the same day the Chairman of the Plague Committee reported to Government that since the 8th October Bombay had suffered from the continuous daily importation of cases of Plague, chiefly from Poona and Satara. The medical officers in charge of the Arthur Road and Hindu Hospitals reported that more than half their patients came from outside Bombay. Within the month 40 cases with serious symptoms had been sent to hospital from the Wari Bunder Camp. And, as shown in the margin, during the four months ending with October of a total of 479 Plague cases 73 were recorded as imported. With this evidence in view, the Committee held it proved that unless supplemented by quarantine on arrival in Bombay, all booking restrictions and up-country arrangements were incomplete remedies.

PLAGUE CASES.

Month.	Imported	Total.
July ...	10	52
August ...	9	65
September ...	25	155
October ...	29	207
	73	479

On the 12th of November, with the evidence of the Committee's letter before them, the Chamber of Commerce gave their unanimous approval to the imposition of quarantine on all arrivals, pronouncing that "no consideration of trade should be allowed to stand in the way of the "benefits which the medical authorities and the Committee anticipated to "be likely to accrue from the imposition of quarantine." On the 14th November Government telegraphed powers to enforce quarantine, and arrangements were introduced on the 19th November. How much vigilance was required to work this detention with success is shown by the sixteen different ways of entering Bombay described by Surgeon-Captain Jennings, I.M.S. (letter No. 996-R. of 25th November 1897), who was in charge of the arrangements (*vide* page 39).

Movements of the people.

				Excess.
OCTOBER..	*Arrivals*—			
	Rail	... 122,047		
	Road	... 124,011		
	Sea	... 36,241		
			282,299	
	Departures—			
	Rail	... 124,776		
	Road	... 127,766		
	Sea	... 35,945		
			288,487	6,188

NOVEMBER.

Rainfall. No rain fell in November.

Sickness and mortality. The first week of November (6th) showed a rise from 250 to 253 in the recorded cases of fever. Plague with a recorded weekly total of 442 was holding its own in Mandvi. Kamathipura was markedly unhealthy. The second week (13th) showed a fall in fever, and a spread in Plague to Umarkhadi and Colaba. The decline in total deaths continued during the third week (20th). The fourth week (27th) showed a further decline in fever, but a rise in recorded Plague from 47 to 66, and a spread into the North Fort. Unlike Bombay the mofussil returns show in November a notable increase of Plague, from 6,970 cases and 5,021 deaths in October to 7,631 cases and 5,864 deaths in November.

Relief works. The demand for relief showed a considerable fall, from 17,925 in October to 7,992, of whom 4,859 were men and 3,133 were women.

Towards the end of November no fresh applicants were taken on, and at its close relief ceased.

Movements of the people.

	Arrivals—			Excess.
	Rail	88,649		
	Road	106,113		
	Sea	38,122		
			232,884	
NOVEMBER ..	*Departures*—			
	Rail	108,024		
	Road	105,581		
	Sea	31,699		
			245,304	12,420

DECEMBER.

Sickness and mortality.

The first week of December (4th) showed no increase in Plague and a decline in fever. The second week (11th) showed a rather serious rise in fever (123 to 170) and a slight increase in Plague cases, but no spread in area. The third week (18th) showed a general increase in disease.* Plague was spreading into the centre and the west of the city. Certain of the cases shown as respiratory complaints were probably due to Plague. Sickness was serious among the Jains—a term under which the Health Returns *loosely* include the bulk of Hindu traders. The fourth week (25th) showed a fall in fever, but a rise both in the intensity and in the area of Plague. During the last five weeks of the year the recorded deaths from Plague rose from 66 to 200. The details for the four weeks of December are :—

Week ending—	Total Deaths.	Recorded Plague Deaths.
December 7th	706	83
„ 14th	785	95
„ 21st	835	158
„ 28th	975	200
January 4th	1,061	302

It is worthy of remark that while the Bombay returns show an increase in cases from 331 in November to 868 in December, and in deaths from 225 to 583, the mofussil returns show a fall in cases from 7,631 to 5,420, and in deaths from 5,864 to 4,825.

Segregation of Contacts.

In early December the arrival of infected persons in Bombay, and in many attacks an increase of virulence and infectiousness, made it probable that at an early date the Plague would develop into an epidemic. To prepare for an increase in disease, two measures received

* This week is generally considered to be the date of the commencement of the second Bombay epidemic.

the consideration of the Committee. These were the separation of Contacts, of the sick man's family, and the vacating of infected or unwholesome houses, with the removal of the inmates to Health Camps.

As regards the segregation of Contacts, no question of the usefulness of the measure could arise. At the same time it was certain to be unpopular. It seemed doubtful how far it could be enforced without risk of serious dissatisfaction. Especial caution also was required since the strict enforcement of the segregation system was likely to add to the temptation to hide cases.

During the former epidemic nothing was done towards segregating the infected beyond encouraging or requiring one, or at most two, members of the family to accompany and attend the patient in hospital. When a room or a house was emptied for cleaning, the inmates were allowed to find fresh lodging where they pleased. So long as the type of plague was not highly infectious, this laxity may have caused comparatively little harm. But the city was still nearly full (containing perhaps 800,000) and the number of highly infectious pneumonia cases imported and local, was considerable and was increasing.

On December 2nd the rules for Contact segregation, printed in the Appendix were issued. These rules provided that in large chawls, unless several attacks took place, it would not usually be necessary to segregate the inmates of more than two or three rooms. In the case of large private houses Contacts might be segregated either in another part of the same house or in an out-building in the same enclosure. Provision was also made that, when Plague Officers admitted its fitness, Contacts might be isolated in a Private Segregation Camp; that cases occurring in an eating-house would not necessitate the other inmates being made Contacts; and that leniency should be shown to goldsmiths, handloom-weavers and other craftsmen who work in their houses. The detention of Contacts was to be limited to ten days and might be reduced to seven, and a modified system of surveillance was sanctioned.

Segregation Camps.

In Public Segregation Camps the inmates were to be supplied with rations, and the bread-winner, whether man or woman, was to be allowed to go to work, provided he spent the night in the camp. The Wari Bunder Camp was set apart for Contacts. Particular care was paid to the disinfecting of their clothes and other articles; at first by washing and sunning, and later, when a stove was available, by passing them

through the steam steriliser. Surgeon Knapp, R. N., who was in charge of the Wari Bunder Camp, arranged the yard outside of the camp, in the centre of which stood the steriliser and round it separate bathing-places and sheds for men and women, where they were washed and clad in camp clothes while their own clothes and other kit were being sterilised. The considerable numbers of persons attacked after entering the camp proved the value of these measures. To prevent suspicious Contacts mixing with the other inmates, they were moved into an isolated section of the camp and remained there until either Plague developed, when they were removed from camp to a Plague Hospital, or until the fever abated and they were allowed to pass into the body of the camp.

In spite of these concessions the Contact system has proved difficult to work. The greatest number of Contacts at any time was 1,061 on March 7. Even after adding the number sent to hospital as attendants, this falls far short of the total number of Contacts which the average daily Plague cases in January and February should have yielded.

Health Camps.

The second leading measure adopted by the Committee to meet the probable increase of Plague was the emptying of infected and unwholesome houses and the planting of the inmates in Health Camps. A Health Camp for 1,000 inmates was opened at Foras Road at the expense of Rao Saheb Ellapa Balaram; the Segregation Camp at Byculla Bridge was improved; and huts were built on the open Agripada Estate to the north of the Byculla Camp.

The action taken by Government made it plain that, if Plague made way in Bombay, its people would be prevented from leaving, and the virulence of the disease and the death-rate might rise much higher than in the previous epidemic.

The moving therefore of large numbers of people from infected and unwholesome houses into Health Camps was a measure to which the Committee attached the greatest importance. The fierceness of the second epidemic in Poona, and of the outbreak in Sholapur, showed how comparatively light the death-rate in the first epidemic in Bombay might be considered.

In December the city was full, but the total population at the time is uncertain. Calculations, varying from 750,000 to 800,000, may be taken as a fair estimate. If the death-rate could be kept within moderate limits, panic might be averted, and the trade of the city might be saved from dislocation. On the other hand, if the people came

to think of their houses as places into which they were shut up to die, panic might seize them, and, in spite of pass and of detention rules, Bombay might be deserted and the mofussil refilled with Plague.

To this was added the consideration that, towards the close of the hot weather of 1897, the sudden return of perhaps 300,000 to 400,000 people compelled resort to infected and evil houses which the medical authorities had condemned as unfit for human use. The Committee were hopeful that a second epidemic might give the chance of cleansing and bringing light and air into many of these, and that, if any large number of houses had to be closed or destroyed, the inmates might find shelter in camps built on sites which might be used throughout the rains. There was the further hope that a provision of huts might remove one of the great difficulties in the way of the new Bombay Improvement Trust and enable that Body to clear spaces and streets.

Deputation.

On the 31st December a deputation of native merchants under the auspices of Sir George Cotton waited on the Plague Committee to lay certain complaints and difficulties before them :—

Complaints.	*Redress.*
As to the inward detention rules the deputation asked for removal or modification of these.	It was explained that the existing rules and practice were not really burdensome. All travellers after medical inspection, if they came from non-infected areas or if they had passes from their place of origin duly signed by a Government Plague authority, were exempt from quarantine. After 24 hours in camp, to enable their clothes to be disinfected, all arrivals who produced the guarantee of a leading member of their caste were free to leave the camp; and temporary leave was granted to holders of valuables to enable the owners to deposit them in safe keeping.
As regards segregation, the deputation asked that no one should be sent to a public hospital unless he failed to go to a private hospital.	It was explained, that no patient whose caste-people had a private hospital was ever taken to a public hospital; and further, as regards Contacts, that if the Committee pass the house as suitable, a Contact living in a good house can be segregated in a separate room.

Complaints—contd.	*Redress*—contd.
As regards the house-to-house visitation, the deputation asked that no searching should take place except in the morning between 6 and 10 a.m.; that females be examined by female doctors only, and that patients with temperature not exceeding 100° be exempt from removal to hospital.	It was explained that house-to-house visitation was carried on only between seven and ten in the morning and between four and six in the evening; that visits were not made at any other time unless information of a case had been given; and that such special visits were not made at night. The wish regarding the examination of females by a female doctor and that no patient with a temperature under 100° should be sent to hospital would be respected so far as was possible. The Committee were always anxious that search-parties and others should be accompanied by one or two local residents. The Committee hoped that this help would be given them now more freely than in the past.
The deputation complained of orders forbidding the export of second-hand sacks.	It was explained that no such order was in force.
The deputation asked that at the bunders thermometers should not be put in the mouths of passengers.	It was explained that instructions had already been issued with a view of lessening, if not putting a stop to the practice, and that these would be repeated.

Movements of the people.

				Excess.
DECEMBER ...	*Arrivals*—			
	Rail	87,656		
	Road	85,996		
	Sea	38,233		
			211,885	
	Departures—			
	Rail	104,426		
	Road	87,781		
	Sea	35,059		
			227,266	15,381

JANUARY 1898.

Sickness and mortality.

In area the plague had now spread from 21 to 25 districts, including Dhobi Talao, Phanaswadi, Girgaum, Walkeshwar, Mahim and Parel. In the 2nd week (8th) the recorded total death-rate rose from 975 to 1,061, and the Plague mortality from 200 to 302. In the 3rd week (15th) the total deaths rose from 1,061 to 1,307, and the recorded

Plague deaths from 302 to 450.* In the 4th week (22nd) the total deaths rose from 1,307 to 1,540, and the Plague deaths from 450 to 651. The 5th week (29th) showed a fresh rise from 1,540 to 1,726 in the total deaths, and from 651 to 834 in the recorded Plague deaths. The Plague was spreading from south to north. Colaba and Sewri alone were free.

While during January in Bombay cases rose from 868 in December to 2,532 in January, and deaths from 583 to 2,515, in the mofussil, cases fell from 5,420 to 4,331, and deaths from 4,825 to 3,500.

Isolating the City.

In the beginning of the year the sudden and vast increase of Plague in Bombay, together with the decline in Poona and in other parts of the Deccan, suggested the detention of travellers leaving the city, and the abolition of the restrictions on arrivals. The Hon'ble Mr. Wingate, the Plague Commissioner, met the Plague Committee to discuss the question of outward and inward inspection. As regards outward inspection by rail it was determined to re-organize the existing system, so that people leaving Bombay by the B. B. C. I. should be detained at Anand, and if travelling by the G. I. P. either at Kalyan or Manmar. At Kalyan the outward inspection was made more rigorous. At the same time Thana and Bandora declared quarantine against visitors from Bombay as an infected district. On the 7th January Anand followed suit with a declaration of ten days' detention.

Bombay was now in a state of isolation. Detention was still enforced in the case of arrivals from infected areas. The difficulty of leaving the city was further increased by the Notification (17th January) that no pass would be granted to any one who had not spent the seven preceding days in Modikhana Camp. The only exception was in favour of residents in the parts of the city which were declared uninfected, and who had been under the supervision of the local Medical Plague Officers for seven days previous to quitting Bombay.

These restrictions failed to keep the Marwadi and Gujarati traders from leaving in large numbers, but the imposition of a ten days' detention at Kalyan and at Bandra greatly reduced the departures by rail, and the prohibition by notification of any native craft carrying passengers from Bombay to any port between Karachi in the north and Bhatgal in the south saved the coast from infection. Persons provided with approved passes were allowed to travel by ferry boats and coasting steamers. As Plague continued to spread in Bombay, the need of inward detention declined and the restriction was removed on the 25th January.

* There had been little emigration of late and the total population was supposed to be twice what it was in January 1897, that is roughly 800,000 as against 400,000.

Narielwadi and Modikhana were now turned into Health Camps and Wari Bunder was devoted to Contacts. The work of emptying infected and unwholesome houses was pushed on and entrusted to three Naval Officers: Lieut. Mansergh, Lieut. Mason and Mr. Jenkin, with 20 Blue Jackets. The household effects of the families sent to the camp were packed into carts and carried to the camp at the charge of the Plague Fund. This Naval contingent was most useful, and the camps at Elphinstone Bridge, Connaught Road, and Narielwadi were filled. In Kamathipura, where during both epidemics Plague secured a very firm hold, Rao Saheb Ellapa Ballaram's successful camp on Foras Road was increased by building huts for 500 additional inmates. With this comfortable accommodation close at hand the Rao Saheb succeeded in emptying a number of unwholesome houses in 15th Street. As has been mentioned the inmates of the Health Camps are free to come and go as they please. Except in isolated cases, where for special reasons the moving was inconvenient, this camping was effected without opposition. The people settled in their huts, improved greatly in health and remained nearly free from Plague; and when their time in camp was over, in many cases they either refused to move or moved with reluctance. **Health Camps.**

Considering the progress of the Plague and the practically imprisoned condition of the 750,000 people of the city, Government came to the conclusion that the scale on which Health Camps were being built was insufficient. They were satisfied that, to prevent the risk of serious calamity—either the increase in the virulence of the Plague due to the overcrowding, or the flight of large numbers of the infected carrying Plague over the presidency—sets of camps large enough to hold 40,000 to 50,000 people were required. On the 31st January a Government Resolution was issued commenting on the dangers of the situation and directing that sites for camps should be fixed in the Harbour Islands and in Salsette.

The Committee considered the subject and found that the Harbour Islands were unsuitable from want of water, but that in Salsette, within easy distance of the Virar and Tansa mains, especially at Santa Cruz, Kurla and Ghatkuper, convenient sites were available.

It was the opinion of the Committee that sites so far from Bombay should in the first instance be offered to the rich and well-to-do. Every effort was made to aid those who were willing to go, and to help by arranging for the water-supply and for sanitation, and by building or providing materials for huts. A Committee of influential natives was

formed to make the wish of Government generally known and to explain the need for leaving infected localities, and the help which the Plague Committee was ready to give to all settlers. A large number of upper-class Hindus had already settled in bungalows and sheds in the parts of Salsette near the railway and were coming daily to Bombay by train. The total number of settlers was probably about 11,000. The scheme for forming camps in Salsette was not successful. The arrangement of clustering in sheds round bungalows, in settlements of forty to fifty families, suited the better class of settlers better than the publicity of a camp. No measure of success attended the efforts to induce any class of working people to settle outside of the Island of Bombay. They could face neither the going so far from their houses nor the time required for the daily journey.

The Members were:—
Sirdar Umar Jamal.
Mr. Vasantji Khimji.
Mr. Narayan Trimbak Vaidya.
The Hon'ble Dr. Bhalchandra.
Rao Saheb Ellapa Balaram.
Mr. P. B. Joshi.

ROUGH ESTIMATE.

G. I. P.		B. B. & C. I.	
Kalyan ...	... 100	Bandora	... 1,000
Diva ...	... 100	Santa Cruz	... 1,000
Dimauli ...	... 50	Malad	... 500
Mumbra ...	... 100	Borivli	... 400
Thana (including Navpada)	... 560	Andheri	... 1,500
Bhandup ...	... 500	Goregaon	... 1,000
Kurla ...	... 1,500		
Chimbur ...	... 1,000		
Ghatkuper	... 2,000		
	5,900		5,400
	Total... 11,300		

The attention of the Committee was therefore turned to the opening of large Health Camps on all convenient sites in the Island of Bombay. The Dadar flats, within easy reach of both railways and of the Tansa and Virar mains, were chosen as the chief site. With the approval of Government it was arranged to build a camp or camps able to house 40,000 people. The work of superintending the laying out and the building of two of the four proposed camps, was entrusted to Captain Swayne, R.E., Executive Engineer, Military Works, and the building was entrusted to two leading contractors who had throughout been of the greatest service to the Committee, Sirdar Umar Jamal and Rao Saheb Ellapa Ballaram. In the neighbourhood of the large camps clusters of huts were built to suit the requirements of well-to-do settlers, and these were occupied at low rents. At Matunga and along the line of the Vincent Road were many private settlements, some of them of timber huts, which had been in use during the former epidemic.

The Committee were anxious that the excellent sites on the north slopes of Antop Hill should be used as a camp. The Municipal Commissioner arranged for a supply of water, and a settlement of about 150 upper-class Hindus was formed. Except that it is nearly a mile from the railway, Antop Hill is an excellent site. Other places admirably suited for camps are the west slopes of Worli Hill and the recently reclaimed shoreland to the south of Sewri.

A sharp outbreak of Plague in Worli in February stirred the people to leave their houses, and a water-supply from the Worli main and other needs were provided. About 25 well-to-do families built huts and moved to the camp, where, except for one case of Plague, they have enjoyed excellent health. So far the experience has been that, except at Dadar, there is little hope of starting camps likely to be popular with the working classes, except in open spaces within the limits of the city.

Increase of staff.

The wider spread and the greater virulence of Plague in January forced on the Committee the necessity for strengthening the staff. The need of dividing charges and of introducing a superior grade of officers on whom the burden of the administration would fall was evident and admitted. Fortunately the decline of Plague in Poona, Nasik and Sholapur made available the services of several trained officers. C Ward, the centre of the city, was divided into two charges—C North and C South. C North, including Kumbharwada, Khara Talao and Bhuleshwar, with a population of about 200,000, was placed under Surgeon-Captain Arnim, whose capability had been proved during the Karachi outbreak in the early months of 1897. C South, including Market, Dhobi Talao and Phanaswadi, with a population of little less than 200,000, was entrusted to Major W. Ross of H. M.'s Durham Light Infantry, one of the most successful combatants of the Poona Plague. Mr. R. B. Stewart, I.C.S., who had brought the Nasik District safely through a serious outbreak of Plague, was put in charge of E Ward, and Mr. A. Wood, I.C.S., of D Ward. The very serious prevalence of Plague in North Fort required the division of A Ward. The Fort was placed under Mr. J. H. DuBoulay, I.C.S., Deputy Municipal Commissioner, who, with the valuable assistance of Mr. Roughton, Mr. Raikes and about twenty other European helpers, carried out with the greatest success the removal of the sick and the cleansing of infected houses.

This outbreak caused during January, February, and the first week of March 632 deaths, a total in excess of the deaths in any quarter of the city, except 649 in Market. The intensity of this outbreak seems to have been in great measure due to the concealment of the earlier cases among Parsis. The vacating of infected and unwholesome houses was placed under Capt. Betham, H. M.'s 8th Bombay Infantry, supported by the Naval contingent, and Lieut. Strong of the same regiment was appointed to supervise the camps.

Employment of Military.

In addition to the want of superior district officers fitted to control the entire system of Plague measures under their charge, the much more rapidly fatal type of the disease required a stronger medical staff to

secure more constant searching of houses. All the available medical staff had been utilised. The only additional searching agency was that of Military search-parties. Military search-parties had been remarkably effectual and popular in Poona. Their value there was beyond question. It was true that British soldiers were stranger to the people of Bombay than to the people of Poona. Still some risk had to be faced, and it seemed fair to suppose that at least in Parsi and in middle-class Hindu quarters the dislike to the strangeness of the agency would pass.

A beginning was made with fifty men of the Durham Light Infantry under Major W. Ross. The men formed search-parties and worked with remarkable expedition and regularity. They were made use of only in Dhobi Talao and Market, where the houses for the most part were those of Parsis and lower-class Hindus. No complaints and no signs of dislike or uneasiness were visible when the search-parties were at work. But in certain parts of Market, Marathas and other middle and lower-class Hindu families, who in Bombay are generally ready to change their lodgings, left. Whether this movement arose from fear of the Plague or because of uneasiness due to the Military search-agency, it is not easy to say. It may be doubted whether as searchers the Military parties were more successful than the former Medical parties, but in any case they were an efficient instrument for detecting concealed or recently infected patients.

By the middle of February the staff was strengthened by 50 more men of the Durhams, by four officers and 50 men of the Shropshire Light Infantry, and by two officers and 25 men of the Royal Artillery. The men of the Shropshire Light Infantry were employed to patrol certain somewhat troublesome streets in B Ward when search-parties were in the houses. This precaution was necessary because of the threats which a section of the Musalmans of Chakla and South Umarkhadi had formerly made against the medical search-parties. The presence of the troops in the streets was sufficient to prevent any repetition of opposition and did not seem to arouse ill-feeling among the people. The Artillery were similarly employed in some of the troublesome parts of Umarkhadi.

Internal movements.

In the beginning of January the Committee hoped they might succeed in confining the Plague to certain portions of the Island. Foot-passers could not well be stopped, but families travelling with cart-loads of furniture might be checked without difficulty. This rule was introduced in the case of Malabar and Cumballa Hills, and, with one or two rare exceptions, it has since been strictly enforced. As the pressure of the disease in the crowded parts of the city increased,

and as the system for preventing departures to the mainland without a detention of ten days was perfected, it became necessary to relax the rule against the movements of families to the northern parts of the Island. Clerks were stationed at certain police posts and took the name and address of the owners of all cart-loads of luggage. This information was forwarded to Surg.-Capt. Jennings, the District Plague Officer for the North of the Island, and all houses occupied by new-comers were placed under medical supervision for ten days.

Besides the supervision of new-comers, to hinder the spread of Plague in the north of the Island, a large body of disinfectors under Mr. Atkinson were employed in Matunga, Sion and Worli, and the greater part of Mahim, removing tiles, limewashing, cleansing, and, where necessary, making openings for light and air. A comparison of the area so treated with the small section which remained uncleansed seems to show that this advanced work proved of considerable value in checking Plague.

Movements of the people.

JANUARY...	*Arrivals*—			Excess.
	Rail	69,529		
	Road	59,823		
	Sea	14,538		
			143,890	
	Departures—			
	Rail	93,518		
	Road	60,794		
	Sea	47,312		
			201,624	57,734

FEBRUARY.

Sickness and mortality.

During the first week of February (5th) the total deaths rose from 1,726 to 1,871, and the recorded Plague deaths from 834 to 927. Thirty-three districts were infected; the North Fort badly. The second week (12th) showed a rise in total deaths from 1,871 to 2,067, and in recorded Plague deaths from 927 to 1,113, though the total Plague mortality was probably not less than 1,231. During the week the death-rate among Europeans was remarkably low;—at the yearly rate of 4·60 per thousand. The third week (19th) showed an increase in total deaths from 2,067 to 2,196, and in recorded Plague deaths from 1,113 to 1,257. The fourth week (26th) showed a decline in total deaths from 2,196 to 1,974,

and in Plague deaths from 1,257 to 1,082. The spreading stage was supposed to be at an end. The Plague had, as in the previous year, travelled from east to west and from south to north. Seven districts had almost entirely escaped—Walkeshwar, Mahalakshmi, Mahim, Sewri, Chowpati, Sion, and Worli. From these, in eleven weeks, only 155 deaths were recorded. The only exception to the increase of mortality during February was in B Ward, which by the end of the month had nearly reached the normal, having fallen from about 40 deaths a day to about 20. While in February in Bombay cases rose from 2,533 in January to 4,591 in February, and deaths from 2,515 to 4,460; in the mofussil cases fell from 4,331 to 3,921, and deaths from 3,500 to 3,090.

House vacation.

In Dongri, a district of B Ward, 1½ miles of the road along the crest of the hill was specially treated. All houses where cases of Plague had occurred were emptied of their people, disinfected, cleansed and improved by cutting openings in walls and in passages. While the cleansing and the alterations were in progress the people were accommodated in the Elphinstone Bridge Camp on Port Trust land. This camp worked well. The health of the people was good. Few of them were willing to leave when the time came for them to go back to their houses. The result of the operations has been satisfactory.

During the week ending February 15th, over 27,000 houses were visited, 1,501 disinfected, and 300 vacated; 478 contacts were sent to Public and 155 to Private Camps. The inmates of the Committee's camps numbered 6,379; about 12,000 people were settled in the suburbs of Bombay, and about 11,500 more in Salsette; that is to say, the houses of the city were relieved of about 30,000 of their inmates.

On Saturday, the 21st February, a serious fire occurred, which destroyed more than half of the Plague quarters attached to the European General Hospital, together with all the wards of the adjoining Modikhana Hospital. The bravery of the nurses, ward-boys, and hospital staff saved all the patients from the flames. The fire began about two o'clock p.m., and was over by four o'clock. Before dark the patients were all removed into a half of the Modikhana Camp which was cleared for their use. Within a day the wards were made comfortable and equipped with all hospital requirements. The re-building of the hospital was pushed on, and by the exertions of Mr. N. M. Wadia, C.I.E., and Mr. M. M. Murzban, the Parsi patients who on the evening of the fire had been kindly received into the Setti Sanitarium in the Fort, were accommodated first in a ward of the Modikhana Camp

and afterwards moved to the new and well-equipped ward in the re-built Modikhana Hospital.

Movements of the people.

	Arrivals—			Excess.
	Rail	53,503		
	Road	56,609		
	Sea	15,566		
			125,678	
FEBRUARY...	*Departures*—			
	Rail	59,896		
	Road	62,002		
	Sea	39,867		
			161,765	36,087

MARCH.

Sickness and mortality.

The first week in March shewed an increase in total mortality from 2,080 to 2,184, followed in the second by a very slight fall (2,137). The third week shewed a rise to 2,269, and the fourth again a fall (1,938). Plague mortality during these weeks stood respectively at 1,496, 1,467, 1,611, 1,269.

Registration of deaths. Corpse-inspection.

Early in March the question of the registration of Plague deaths re-engaged attention. The question of corpse-inspection had been examined with great care by the Plague Committee. Corpse-inspection had been useful in Karachi and in Poona. A section of native opinion in Bombay declared that no objection existed in Bombay to corpse inspection.

The Committee however decided that this opinion was not in agreement with the customs and feelings of any class in Bombay, that any attempt to enforce corpse-inspection was likely to give rise to active ill-feeling, and that the possible advantages from the practice were outweighed by the certainty of discontent.

The Committee held that all that could be insisted on was the address from which each funeral party started. Towards the end of February as the number of deaths referred to "unknown causes" continued high—about 70 a day—an effort was made to obtain a statement of the cause of death in cases attended by practitioners. The leaders of the different Committees were consulted, with the result that whether from misapprehension or misrepresentation, the story was spread that the Committee were arranging for corpse-inspection.

Riots.

On the morning of the 9th of March a Julaha or handloom-weaver, one of a class of North Indian Musalmans, whose poverty and excitableness make them ready tools in the hands of the disaffected, refused to let his daughter, a girl of about twelve, be removed to hospital. The girl was seen by a nurse who believed her to be suffering from Plague. The

Hakim or Musalman practitioner who managed the special Julaha Hospital was not allowed to see the girl. A band of youths came out with sticks and drove him and the Choudhari or head of their community out of their quarters, threatening to take their lives because they had helped in Plague operations. The crowd of Julahas increased and, refusing to disperse, and having wounded the Magistrate severely with stones, were fired on.

The rioters fled to Kamathipura and to Paidhowni where they were joined by local bad characters, both Hindus and Musalmans. The mob fired the Grant Road and Musalman Hospitals, burned down the Plague Office in Nagpada, and committed many grievous and some fatal assaults on Europeans. Before dark however all rioting had ceased, and on the next day no attempt at disorder was repeated. During the mornings of the three following days the Committee, with the help of the military, arranged, in the parts of the city where opposition was most likely, for searches of large areas.

These searches were most successful. No attempt at disorder or opposition was encountered, and indeed few signs of displeasure were evinced, though a large number of cases were found and taken to hospital.

To whatever extent irritation with Plague measures and annoyance at the failure of the measures to reduce the death-rate were the cause of the riot of the 9th March, its effects on the progress of Plague measures was most serious. The extreme ill-feeling shown by the rioters and the strike among cartmen and dock-workers on the 11th March hurried on a change which had been already under contemplation—the replacing of medical search-parties by the formation of a large number of volunteer Committees.

Local Volunteer Committees.

The new scheme was generally indicated in a speech by His Excellency the Governor at the Town Hall to the assembled justices and prominent citizens of Bombay. It prohibited search by the District Staff in any house which had not been notified as Plague infected, unless other circumstances caused it to be a gravely suspected house. His Excellency's hope was to secure a sufficient number of zealous workers to allow of parcelling sections of the city into divisions so small, that the members of the local Committees would be able to know every case of death, and even of sickness, within their beat.

The Plague Committee in conjunction with the District Officers at once called meetings of influential residents at the different District Plague offices.

Each district was sub-divided into several small areas, and for each area a Committee was formed of gentlemen living in or near that area. Gentlemen who were not present, but whose names had been given at the meeting, as likely volunteers, were communicated with later by the District Officers. Each Committee was asked to hold meetings for the purpose of electing a Chairman and Secretary, and the duties expected of them were at first verbally explained.

The rules shortly afterwards promulgated will be found in the Appendix.

The members of certain Committees asked to be supplied with Police or Military sepoys to accompany them on their rounds of inspection. But they were told that they had been chosen as persons possessing personal influence over the inhabitants of their sections, and that it was the desire of Government that an attempt should be made to work the new visiting machinery without any show of compulsion.

The first Committees to get to work were those in Phanaswadi in C Ward (South).

A Ward, which comprises Colaba, Esplanade and Fort, was divided into two parts—Colaba, and the remainder of the ward. In this ward the members did not elect Chairmen from among themselves, but preferred to let the District Officer act as Chairman. This ward was the last to be re-organised, but when started it at once began to work well.

B Ward, consisting of Umarkhadi, Dongri, Chakla and Mandvi, was divided into 9 sub-sections. This, though an exceedingly difficult ward to work in, soon settled down to the new system with the exception of the Committees of Memon Moholla, which never worked at all, and West Chakla, and a portion of Mandvi which did very little. For these last-named Committees a great many residents gave their names as volunteers, but very few ever appeared for work. The most satisfactory Committee in the ward was the Khoja Committee.

C Ward (North), consisting of Kumbharwada, Khara Talao and Bhuleshwar, was sub-divided as follows :—Kumbharwada into 7 Committees, Khara Talao into 6, and Bhuleshwar into 6.

This district is exceedingly hard to work in ; it is very thickly peopled, mostly by Mahomedans, and was at the time in a very unsettled state. By the 15th of April all the Committees were either working or making an attempt to work, with the exception of one in

Khara Talao and one in Kumbharwada. The results were not satisfactory, though the reports stated that a great many houses had been visited, and though the cemetery reports proved a number of deaths from this ward.

C Ward (South), including Phanaswadi, Dhobi Talao, and Market, was divided up into 18 Committees—Phanaswadi 4, Dhobi Talao 6, and Market 8. Almost all the Committees in this ward soon set to work, and worked systematically, especially the Committees in Phanaswadi. In the Market District, two Committees were slow in commencing. Taking into consideration, however, how thickly this ward is peopled, the Committees worked exceedingly well. In their favour is the fact that the people were not of such a troublesome class as those in C (North), most of them being Hindus.

D Ward (East), which comprises Girgaum, Khetwadi and Chowpati, was divided into 8 Committees. Of these, the Chowpati and Girgaum Committees were the first to start and have worked well. These two sections are mostly inhabited by high-class Hindus. The Khetwadi Committees were slow in starting, the reason being that influential men did not at first offer their services. In this section there are a great many Mahomedans.

D Ward (West), consisting of Walkeshwar and Mahalakshmi, was divided in the same way as A Ward, the Native members preferring to work in the localities in which their houses were situated and not to form Committees.

E Ward, which is the largest ward in Bombay, comprising Nagpada, Byculla, Tardeo, Kamathipura, Mazagon and Tarwari, was apportioned among 10 Committees—2 in Tardeo, 2 in Nagpada, 1 in Kamathipura, 3 in Byculla, 1 in Mazagon, and 1 in Tarwari. Of these Committees, the two in Tardeo did the best work; next to them the Kamathipura Committee. Two of the Byculla Committees and one of the Nagpada Committees have done very little. These last-named districts were very difficult to manage in, being mostly inhabited by Julaha Mahomedans, who frustrated the endeavours of the Committees as much as possible.

F and G Wards, comprising Parel, Dadar, Matoonga, Sion, Mahim, Worli, and Sewri, were divided into 15 Committees. Of these, two Committees in Dadar immediately got to work and have worked exceedingly well from the commencement. The remainder

have also worked well, with the exception of the Mahim and Sewri Committees, who did nothing. These last localities are not thickly peopled and are surrounded on all sides by stretches of open country which give every facility for segregation.

A list of Native Committees will be found in the Appendices.

Movements of the people.

				Excess.
MARCH	*Arrivals*—			
	Rail	66,296		
	Road...	61,849		
	Sea	19,977		
			148,122	
	Departures—			
	Rail	61,523		
	Road...	61,849		
	Sea	39,215		
			162,587	14,465

APRIL.

Sickness and mortality.

As the decline in the epidemic continued, Plague cases fell from 1,117 during the last week in March to 899 during the first week in April, and estimated deaths fell from 978 to 871. The second week showed a further fall to 676 Plague cases and 620 Plague deaths. The decline continued in the third week to 604 Plague cases and to 541 Plague deaths, and in the fourth week to 546 Plague cases and to 499 Plague deaths.

On March 18th the plague had reached its climax. After this date it steadily declined until on April 30th only 33 deaths from the disease were recorded.

Plague mortality.

In the following table the Plague mortality of the 2nd half of March is contrasted with that of the 1st and 2nd halves of April:—

	March 15—31.	April 1—15.	April 16—30.
A Ward	18	19	5
B „	141	39	48
C „	197	72	43
D „	200	59	43
E „	499	222	250
F and G Wards	223	198	172
Totals... ...	1,278	609	561

The chief feature of the administration of the month was the success which attended Mr. Stewart's efforts in E Ward in moving 277 persons from infected chawls into the Narielwadi, Marathi, Byculla and Foras Road Camps. Mr. Müller also succeeded in moving 268 persons from an infected chawl in Elphinstone Road into the Dadar Camp. In B Ward and, to a less extent, in C Ward, as the fear of Plague died out, the people showed less willingness to move into camp.

Health Camps.

As the decline of Plague and the increased activity in trade made it probable that numbers from the Konkan and Deccan would be tempted to come to Bombay, the Committee were anxious that as many as possible of the new-comers should on arrival go into camp and escape the risk of infection in crowded and unwholesome houses. The scheme was approved by Government and letters were addressed to the Chamber of Commerce and the Millowners' Association in Bombay, and to the Collectors of Konkan and Deccan districts, asking them to arrange that intending passengers for Bombay might be advised on arrival to go into Health Camps. The first firm to take advantage of the arrangement has been Messrs. Ralli Brothers. Three batches of workmen with their families from Khandesh and Ahmednagar have arrived in the Elphinstone Bridge Camp. They are excellent inmates and are highly satisfied with all the arrangements.

Local volunteer Committees.

The question of the working of the new volunteer Committees is still somewhat doubtful. Several among them, especially in South C and in E Wards, continue to work hard; others are indifferent. One notable result of the slackening of official measures has been the almost complete stoppage of patients, especially of female patients, sent to the Public Hospitals. This is a serious evil as, with a death-rate averaging little below 150 a day, a very large number of cases must remain concealed or treated at home.

The result is not so disappointing in the Caste and Community Hospitals. The Maratha Hospital, which is nearly in the centre of the most infected areas, continues to maintain a daily average of about ten admissions. Both in the General Musalman and in the Julaha Hospital in Ripon Road the numbers of admissions continue fair. In the Private Hospitals in B and C Wards the number of admissions has been small, but perhaps not greatly short of the number of attacks. Except in E Ward, where it has been pushed forward with vigour, the work of vacating infected houses has declined to a disappointing extent.

Another unsatisfactory feature in the returns for the month is the small number of Contacts who have been segregated in camp. It seems unlikely that the number of Contacts will again increase.

Movements of the people.

April 1—15.	*Arrivals*—			Excess.
	Road	23,001		8,956
	Rail	36,666		
	Sea	15,858		
			75,525	
	Departures—			
	Road	27,301		
	Rail	22,611		
	Sea	16,657		
			66,569	

After ebbing for nine months, the tide turned, and the number of arrivals began to considerably exceed the departures; while the very high wages ruling among dockmen and other labourers, the great mass of trade passing through Bombay, and the scanty cold weather harvest in the Deccan combined to make a large inflow of labour probable during the month of May.

CHAPTER II.

FAMINE RELIEF.

Of the general protective measures with which the Committee concerned themselves to limit the recurrence and diffusion of plague one of the most important was the treatment of arrivals from famine-stricken districts.

As General Gatacre wrote in his Report of the First Epidemic (page 127), most of the inmates of Observation Camps arrived in an emaciated condition. Some arrivals from famine-stricken districts were detained in camp mainly to improve their condition by good feeding. Had they passed into the city in the state in which they arrived, they would have been highly susceptible to Plague or cholera. Half-starved immigrants continued to arrive in large numbers in July and August, and as the abnormal mortality was in great measure due to them, the question of their employment became so serious that, on the 20th August 1897, in a letter to the Chief Secretary to Government, the Committee put forward the following proposals :—

(*a*) That test relief works should be opened at Chinchpokli or Ghorapdev, or, if necessary, at more places than one.

(*b*) That if the inflow of people in search of work became excessive, the reduced and the improvident should be stopped before entering Bombay, fed for a day or two at camps at Bandra or Sion, and perhaps at Kalyan and Nagothna, and sent back to their homes.

(*c*) That, after the close of the rains, should the numbers still arriving prove more than local relief works and the general labour-market could provide for, the excess should be sent to a relief camp at Kurla, Andheri, or Kalyan, or, if the numbers from the Deccan were large, to a relief camp in the west of the Poona District.

On the 28th August (G. R. No. 1623) Government admitted that, so far as possible, Collectors should provide local relief works for the

famine-stricken. At the same time Government wished that test works should be started in Bombay to gauge the number of the unemployed.

Before this Resolution was passed (on 26th August) the Secretary of the Indian Famine Relief Fund had forwarded to the Chairman of the Plague Committee a cheque for Rs. 10,000 to relieve the famine-stricken in the Island of Bombay. A special local subscription list was also started, and handsome contributions were received. Measures were taken to find out the probable number of people for whom work should be provided, and the nature of the work likely to prove most suitable.

On the 2nd of September a census of several chawls taken by the Municipal Commissioner showed 1,058 persons unemployed.

On the same date (2nd September) the Committee informed Government that work had been offered to the destitute, securing the employment of twelve carts, each cart drawn by six men to go twice a day to the Love Grove Pumping Station at Worli, a distance of 3½ miles, and bring back ashes and clinkers to raise the compound of the Julaha Hospital in Ripon Road.

A certain number of weakly women with suckling babes were also admitted to relief, and for a nominal amount of work were paid two annas a day.

The workers were paid daily, and the cost was defrayed entirely from the charitable funds in the hands of the Committee. On the first day enquiries showed that there were 257 workers, most of them Julaha Mahammadans and the rest Mahars:—

Ahmednagar	5	Khed	30
Allahabad	15	Junare	31
Akola	3	Malegaon	30
Azimgarh	18	Nasik	18
Benares	2	Paner	8
Bullanpur	19	Poona...	10
Cawnpur	12	Sangamner	4
Faizabad	10	Satara...	11
Ghode...	13	Sultanpur	4
Ghodegaon	4	Shahajanpur	13
Karad...	4		

According to their own statement, most of these people had been from one to three months in Bombay, and several, even from Upper India, had walked the whole way from their homes. To meet the further demand for relief 600 people were employed to fill low ground between the Clerk and Haines Roads, which was flooded with storm-water and sewage, under the same conditions and at the same rates of pay as at the Ripon Road Work.

The breaking of road-metal proved a suitable employment for women with children and for the older men.

In a shed alongside of Clerk Road 6,735·12 cubic feet of metal were broken which were taken over by the Municipality at a valuation of Rs. 336-12-0.

The expenditure on the relief works was met from two sources :—

(1) The grant of Rs. 10,000 from the Indian Famine Charitable Relief Fund.

(2) The Committee's Plague Relief Fund, from voluntary subscriptions, amounting to Rs. 9,422.

Of the Committee's Fund, Rs. 5,030-1-4 were spent, and when the necessity for relief came to an end, a balance of Rs. 3,666-15-2 from his grant of Rs. 10,000 was returned to the Secretary of the Famine Relief Fund. The total expenditure therefore amounted to Rs. 11,363. The total number of persons who received relief was 51,805. The demand increased from 10,755 in August to 15,033 in September and 17,925 in October. It then fell to 7,992 in November, and on the 29th of November the relief works were closed.

The details are as follows :—

Charitable Relief, 1897.

Months.	Men.	Women.	Children.	Total.
August	8,770	1,952	33	10,755
September	10,702	2,411	1,920	15,033
October...	11,855	5,574	596	17,925
November	4,859	3,133	.....	7,992
Total ...	36,186	13,070	2,549	51,705

The effect of these measures, though small, was good. Without in any way disturbing the regular labour-market the wages helped a large number of willing and deserving poor to tide over a time of dear grain and slack work.

CHAPTER III.

QUARANTINE.

The chief administrative precaution against the recurrence and diffusion of Plague was of course quarantine, by which we understand measures of inspection, detention and disinfection of passengers and their baggage.

Quarantine may be by land or sea. In the case of Bombay it is both, the island being connected with the mainland by two Railways and several Causeways.

Quarantine again may be inward or outward, *i.e.*, it may be imposed against in-comers or it may be enforced against out-goers. Its obvious disadvantages are the restriction it imposes on trade. In a country like India the restriction it imposes on the occasional movements of the people to celebrate religious festivals and private festivals, such as marriage and death, are felt as grievances and persecutions. It is true the Mahomedans are enjoined by their religion not to enter nor to leave infected districts, but to the Hindu there is no such religious restriction.

The restrictions are of course especially felt as regards outward movements. To be kept in quarantine at the place you start from, with no guarantee that you will thereby be exempted from quarantine by the Local Authorities of the place you arrive at, is very vexatious.

To avoid the quarantine at the start, District Officers were empowered to issue clean bills of health, and guarantees were accepted from leading natives that the intending travellers would proceed direct to their destinations. The great labour involved by these measures of certifying, inspecting and detaining will be gathered from the subjoined table of movements. It must be remembered, however, that a large proportion of these travellers went daily in and out of Bombay, and that, being known to the Officers on inspection duty, their general appearance and gait, without even the formality of feeling the pulse, often sufficed to show that they were free from infection.

Movements.

Months.	Arrivals.	Departures.	Total.
July	200,264	204,272	404,536
August	225,156	240,380	465,536
September	290,319	295,138	585,457
October	282,299	288,487	570,786
November	232,884	245,304	478,188
December	211,885	227,266	439,151
January	143,890	201,624	345,514
February	125,678	161,765	287,443
March...	148,122	162,587	310,709
April	75,525	66,569	142,094
Total...	1,946,022	2,093,392	4,039,414

Railway Inspection.

The general rules under which Railway inspections were conducted were as follows :—

(*a*) All trains arrived with carriages locked at the inspection stations.

(*b*) The examination of first class passengers, except in the case of delicate or sickly persons, was not generally considered necessary.

(*c*) Season-ticket holders were generally exempt from inspection.

(*d*) Second class passengers were examined in their carriages.

(*e*) Third class passengers were examined on the platform, one compartment being emptied at a time by the Railway Police, who searched the carriages while the passengers were being examined by the inspecting officers.

(*f*) Special tact and discretion were ordered in the examination of females, and in the case of *Purdah** women who objected to their wrists being felt, they were allowed to proceed without examination on their names and addresses being taken.

(*g*) Local passengers were examined before the arrival of trains and kept in a barricaded portion of the station until after the inspection of passengers arriving by trains.

(*h*) Station Masters were requested, as far as possible, to keep the platforms clear of all except officials on duty.

* *Purdah* means "curtain."

(*i*) No train was allowed to leave an inspection station until the Guard in charge had received a certificate in the following form :—

"To the Guard in charge of Train No. from

Date 1898.

Time

In accordance with Rule I of the Rules framed under the Dangerous Epidemic Diseases Act No. III of 1897, I certify that to the best of my knowledge and belief all persons proceeding by the No. train from , whether railway servants or passengers, are free from Bubonic Plague.

Medical Officer."

(*k*) A daily return was sent to the Superintendent of Medical Inspection of Railway Passengers and to the Secretary of the Plague Committee in the following form :— **Daily returns.**

No. of cases previously detained.	No. of "actual" cases detained in the 24 hours.	No. of "suspected" cases detained in the 24 hours.	Total of 24 hours.	Grand Total.	How disposed of.

(*l*) From Palghar, as there was a hospital there, a daily return in the following form was sent to the Superintendent, the Secretary of the Plague Committee, and the Secretary to Government, General Department :—

STATEMENT showing result of inspection by Medical Staff at Station from 12 a.m. of to 12 noon of

Classification of persons detained.	Suspected cases.								Plague cases.								Remarks.
	Number of fresh cases detained during 24 hours.	Balance of cases left over from previous 24 hours.	Total.	Of those entered in column 4, the No. who during the 24 hours under report— Have died.	Have been found free from plague and discharged.	Have been found to be suffering from plague.	Have been otherwise disposed of.	Balance remaining under observation at end of 24 hours under report.	No. of fresh cases detained during 24 hours under report, excluding those shown in column 7.	No. of suspected cases transferred as plague cases during 24 hours under report, as shown in column 7.	Balance of cases left over from previous 24 hours.	Total.	Of those entered in column 13, the No. who during the 24 hours under report— Have died.	Have recovered and been discharged.	Have been otherwise disposed of.	Balance remaining under treatment at end of 24 hours under report.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Passengers by Up Trains from..																	
2. Passengers by Down Trains from ..																	
3. Non-Passengers..																	

Arrangements for inspection, July 1897.

Arrangements existed on the 1st of July 1897 for the medical examination of all passengers arriving at Bombay by local, mail, and other trains, from beyond the limit of local traffic, and of all passengers leaving Bombay by mail trains, and trains bound for stations beyond the limit of local traffic. There were also barrier inspection staffs for the examination of local passengers at Thana and Kalyan on the G. I. P. line, and at Bandora on the B. B. C. I. line.

Kalyan.

On the G. I. P. Railway at Kalyan Station, all passengers leaving Bombay for Kalyan or stations beyond were examined, as well as all passengers from stations beyond Kalyan arriving at Kalyan or bound for stations south of Kalyan. Passengers alighting at Kalyan were examined at the ticket barrier by a special staff, and those going north or south of Kalyan upon the platform by another staff. All cases and suspicious cases of Plague were sent at once to the temporary hospital, consisting of fitted up railway ambulance carriages in a goods shed, from whence actual cases were sent as soon as possible by trains to Chinchpokli Station (where they were met by ambulances and conveyed to Arthur Road Hospital). Suspicious cases were detained in the Kalyan carriages for observation, and were either allowed to proceed to their destinations, or dealt with as Plague cases, according to circumstances. An ambulance cooly was constantly on duty at Chinchpokli Station, who on receiving a telegraphic message through the Station Master there from the Station Master at Kalyan, intimating the number of cases sent, and by what trains, provided the necessary ambulance for their removal on arrival. All compartments in which Plague patients were sent were labelled "To be disinfected."

The staff consisted of—1 Chief Medical Officer, 2 Assistant Surgeons, and 9 Hospital Assistants.

Thana.

At Thana Station a staff was posted at the ticket barrier to prevent local cases of Plague from entering the trains. The medical staff consisted of three Assistant Surgeons who divided the hours from 2 a.m. to 10 p.m.; the menial staff consisted of one bhisti and one sweeper.

Sion.

At Sion Station all passengers in local trains bound for stations in the Island of Bombay were examined, and all cases and suspects were sent by trains to Chinchpokli Station for removal to Arthur Road Hospital under the same precautions as were observed in cases sent from Kalyan. The staff consisted of—1 Chief Medical Officer, 3 Assistant Medical Officers, 3 Assistant Surgeons, 4 Hospital Assistants, 1 Medical Student, 1 Muccadum, 6 Coolies, 1 Bhisti, and 1 Sweeper.

On the B. B. C. I. Railway, at Palghar Station, all passengers from Bombay bound for stations beyond Palghar were examined, and all cases and suspects sent to a hospital adjoining the station, where the cases were kept for treatment. Suspects, if found (after observation) to be free from Plague, were allowed to proceed to their destinations. The staff consisted of 1 Chief Medical Officer, 2 Assistant Surgeons, and 7 Hospital Assistants. **Palghar.**

At Bandora Station, all passengers in local trains bound for stations in the Island of Bombay were examined, and all cases and suspects were sent by trains to Mahalakshmi Station, where they were met by ambulances from Arthur Road Hospital. An ambulance cooly was always on duty at Mahalakhsmi Station, who, on receiving telegraphic intimation through the Station Master there from the Station Master at Bandora Station of the number of cases sent and the time of trains, arranged for sufficient ambulance accommodation to meet such trains. At Bandora Station a barrier staff was posted to prevent local Plague cases entering trains, and to prevent cases from trains entering Bandora. The staff at this station consisted of 1 Chief Medical Officer, 1 Assistant Medical Officer, 5 Assistant Surgeons, 1 Medical Student, 5 Hospital Assistants, 1 Muccadam, 1 Bhisti, 2 Sweepers, and 3 Coolies. **Bandora.**

Towards the end of October, in view of the increased influx of passengers into Bombay from infected districts, it was considered advisable to strengthen the inspection staffs, pending the adoption of a system of detention of passengers from infected areas which was then in contemplation. The following changes were made in the beginning of November: 2 Medical Practitioners and 2 Nurses were added to the Bandora Staff, 1 Commissioned Medical Officer was appointed to supervise the Sion and Thana Staffs, and the Kalyan Staff was augmented by the addition of 1 European Medical Officer, 3 Medical Practitioners, 1 Lady Doctor, and 3 Nurses. **Transitional arrangements in October and November.**

On the 19th of November detention of passengers from infected areas was commenced, and the following arrangements were made, pending the more permanent scheme which was being organized.

On the G. I. P. Railway all third class ticket-holders were sorted at Kalyan, and those possessing tickets for Kurla or any station in the Island of Bombay from all stations between Ahmednagar and Dhond inclusive; between Dudni and Poona inclusive, between Miraj and Poona inclusive, and between Poona and Kalyan, including Poona,

were locked into separate carriages and run into Byculla Station, where they were met by the Plague and Police authorities.

On the B. B. C. I. Railway all third class ticket-holders were sorted at Palghar, and those found with tickets for Bandora or any station within the Island of Bombay from all stations between Anand and Palghar were locked into separate carriages and run into Grant Road Station, where they were met by the Plague and Police authorities.

Arrangements, 1st December 1897.

On the 1st December 1897 the more permanent scheme came into force, and this necessitated some modification of the general organization above described.

Arrangements having been made with the Railway Companies to run all passengers from north of Virar and Kalyan with tickets for Bandora, Kurla, or any stations in the Island of Bombay in locked carriages from Virar and Kalyan to Grant Road and Victoria Terminus Stations, respectively, and to hand them over to the Plague and Police authorities at those stations for sorting, it was decided to have such passengers also medically examined at Grant Road and Victoria Terminus, respectively, instead of at Palghar and Kalyan, and in order to effect this a re-distribution was made of the total establishment. The result of this re-arrangement is given in the following table :—

Victoria Terminus.	Sion.	Kalyan.	Grant Road.	Bandora.	Palghar.
1 Chief Medical Officer.	1 Chief Medical Officer.	1 Chief Medical Officer.	1 Chief Medical Officer.	1 Chief Medical Officer.	1 Chief Medical Officer.
2 Medical Practitioners.	4 Medical Practitioners and 6 Assistants.	2 Assistants.	1 Medical Practitioner.	4 Medical Practitioners.	2 Hospital Assistants and 1 Medical Student.
2 Native Practitioners.		3 Medical Students and 2 Nurses.	2 Assistants and 1 Nurse.	4 Assistants.	
6 Hospital Assistants and 2 Nurses.					

So many possible contingencies presented themselves whereby passengers from infected areas could evade detention by working themselves from the through into the local traffic that special arrangements had to be made with the Companies to obviate such difficulties, and the following statement, compiled by Surgeon-Captain Jennings, I.M.S., who was in charge of Land Inspection, gives in a tabular form the possible contingencies and the measures arranged to obviate them :—

G. I. P. line.	B. B. C. I. line.	Possible contingencies.	Measures adopted.
Infected area.	Infected area.	G. I. P. (I) Passengers from beyond Kalyan could book to Kalyan and re-book to Bombay in a local train. B. B. C. I. (I) Passengers from beyond Virar could book to Virar and re-book to Bombay by a local train.	(I) Booking to Bombay from Kalyan and Virar was stopped, except for season ticket-holders or those possessing certificates from Plague authorities allowing them to travel.
Kalyan. Demanli.	Virar. Nalla Sopara. Bassein.	G. I. P. (II) Passengers could alight at Kalyan and walk to Mumbra Diva, or Demanli and book by a local train to Bombay. B. B. C. I. (II) Passengers could alight at Virar and walk to some station south thereof and book to Bombay in local trains.	(II) The Company stopped booking at these 3 stations, except for season ticket-holders. (II) The Company promised to report if the booking from stations south of Virar increased.
Diva. Mumbra. Thana. Bhandup. Ghatkuper.	Bhynder. Borivli. Malad. Goregaon. Andheri.	G. I. P. (III) Passengers could book to Thana and re-book from there to Bombay by locals. B. B. C. I. (III) Passengers could book to any stations between Virar and Bombay and then re-book to Bombay in locals, as some through trains stop at all stations.	(III) Booking was stopped there, except for season ticket-holders or those who possessed certificates from Plague authorities allowing them to travel. (III) The Company consented to run all trains from beyond Virar through to Grant Road, and to stop all booking from north of Virar to any station south of Virar and north of Grant Road.
Kurla.	Santa Cruz. Bandora.	G. I. P. (IV) Passengers could alight at Thana and walk to Bhandup, Ghatkuper or Kurla, and book to Bombay. B. B. C. I. (IV) There is no station on the B. B. C. I. Railway corresponding to Thana.	(IV) The Company would not stop booking from these stations, but promised to report if the booking became heavier, so that later steps could be taken. (IV) No steps necessary.
Mahim River.	Mahim River.	G. I. P. (V) Passengers could book from the G. I. P. to B. B. C. I. lines and slip into Bombay at Dadar. B. B. C. I. (V) Passengers could book from the B. B. C. I. to the G. I. P. lines and slip into Bombay at Dadar.	(V) The Company stopped this. (V) The Company stopped this.
Sion. Matunga. Parel. Curry Rd. Chinchpokli.	Mahim. Dadar. El. Road Parel. Mahalakshmi.	G. I. P. (VI) Passengers could book from stations north of Kalyan to stations between Kalyan and Thana or between Thana and Sion and change into local trains at Kalyan or Thana and thus slip into Bombay. B. B. C. I. (VI) Passengers could book from stations north of Virar to stations south and change into a local train at Virar and thus slip into Bombay.	(VI) The Company stopped booking from stations north of Kalyan to Diva, Demanli, Mumbra, Bhandup, and Ghat-kuper. (VI) The Company stopped such booking.
Byculla. Musjid. Victoria Terminus.	Grant Road.	G. I. P. (VII) Passengers could alight at Thana and walk to Sion Causeway. B. B. C. I. (VII) Passengers could alight at Virar and walk to Bandra Causeway.	This was obviated by instituting a system of causeway detention.

At Victoria Terminus the G. I. P. Railway Company set apart and fenced in a portion of the station known as the Arcade for the sorting and examination of passengers, and at Grant Road Station the B. B. C. I. Company fenced in the northern end of the Up Platform for that purpose.

Altered arrangements, January 1898.

A recrudescence of the Plague epidemic having become established in Bombay, a meeting was held on the 2nd of January 1898, at which were present the Plague Commissioner, the President and Members of the Bombay Plague Committee, the Superintendent of Medical Inspection of Railway Passengers, and the Collector of Thana. In order to protect the Thana District, it was decided to inspect all down local as well as up local trains at Bandora and Sion Stations, to discontinue inspections of through and mail trains at Palghar Station, and to hand that duty over to the Bandora Station staff. In consequence of this the Palghar Staff was disbanded, and the Sion and Bandra Staffs considerably strengthened, and on the 3rd of February the control of the Kalyan Staff was handed over by orders of Government to the Collector of Thana.

On the 24th of January 1898 it was decided to suspend the detention of passengers from infected areas outside the city until such time as the epidemic should subside. This led to some further alterations in the different staffs, resulting in an establishment which is set out in the following tabular statement :—

G. I. P. Railway.		B. B. C. I. Railway.	
Victoria Terminus.	Sion.	Grant Road.	Bandora.
Dr. R. H. Castellote. Dr. N. R. Arjani. Dr. S. D. Nadersha. Mr. Y. C. Mhaskar. Mr. F. D. Moos. Mr. Vinayak R. Joga. Miss Maine. Mr. Gangaram Vithal. Mr. Francis Borges.	Dr. K. M. Dubash. Dr. D. Burjorjee. Dr. F. P. Master. Dr. D. D. Bode. Dr. A. A. Gairi. Dr. B. R. Wadia. Mr. N. A. Misquita. Mr. M. P. D. Conceicao. Mr. B. M. Jaykar. Mr. J. J. Gilder. Mr. M. R. Vaidya. Mr. Simon Pereira. Mr. L. G. Fernandez. Mr. D. A. Vaz. Mr. P. F. Rana. E. A. D'Souza. Mr. Prabhakar Balwant. Mr. J. J. D'Mello. Mr. Dhiraj Lal Maganlal. Gopaljee Ghulabhai.	Dr. N. B. Lam. Mr. L. A. Fernandez. Mr. J. A. Gonsalves. Mrs. H. A. Smith.	Dr. N. R. Satpute. Dr. B. N. Horsedealer. Dr. H. N. Contractor. Dr. D. Dadarkar. Dr. S. E. Dubash. Dr. A. P. Dias. Mr. J. S. Mody. Mr. E. M. Pereira. Mr. S. D. Rebello. Mr. De Abreo. Mr. S. M. Pereira. Mr. P. G. D'Silva. Mr. A. R. Satpute. Mr. J. A. Gonsalves. Mr. F. X. Pereira. Mr. L. M. D'Penha. Mr. L. B. Nunes.
Examination of passengers in all up through and mail trains.	Examination of passengers in all up and down local trains.	Examination of passengers in all up through and mail trains.	Examination of passengers in all up and down local trains and all down through and mail trains.

The following table gives the result of the inspections for the period under report :— Table of results.

Stations.	Passengers detained.	Passengers sent to Hospital.
Kalyan	341	112
Sion	228	228
Victoria Terminus	40	40
Thana	19	19
Palghat	709	290
Bandora	974	222
Grant Road	25	25
Total ...	2,327	876

The members of all the staffs worked conscientiously and well, and the general smoothness and regularity which characterized the conduct of duties which, from their nature, are often attended with unpleasantness, reflect the greatest credit on the tact and patience of the Chief Medical Officers of staffs.

The Committee desire to take this opportunity of bringing prominently to notice the great courtesy and invariable cordiality received from all the officers, administrative and executive, of both the G. I. P. and the B. B. C. I. Railway Companies. Their willing co-operation and ready assent to measures which, though necessary, were often against the interests of the companies, made the task of organization a simple one, and it is with pleasure that the Committee are able to say the same of the relationship which invariably existed on the part of the Subordinate Railway staffs towards the Medical Inspection staffs. All members of medical inspection staffs who were unable to reside near the stations at which they were on duty, were granted complimentary passes by the Agents of the Companies.

Causeways Inspection.

The following are the means of ingress by foot into Bombay :— Causeways.

(1) The Mahim-Bandora Causeway; (2) the Sion-Kurla Causeway; (3) the G. I. P. Railway Causeway; (4) the B. B. C. I. Railway Causeway; (5) a tract of land generally fordable between Kurla in

Salsette and Sion village at the north-east corner of the Island of Bombay; and (6) a small line of railway running on a bund supporting the Tansa main pipe from Chimbur (a place east of Kurla) to the north-east corner of the Island of Bombay.

The above ingresses run mainly north and south between Mahim on the west and Trombay on the east, a distance of about five miles, and in order to examine all inward and outward passengers (other than Railway passengers) it was necessary to prohibit the use of all the above ingresses except the first two. This was done in the case of (3) and (4) by posting Police guards to keep foot-passengers from crossing, of (5) by posting a Police sentry in such a position as to cause all people crossing the tract to proceed by No. 2 route, and of (6) by keeping a swinging bridge in the course of the line always closed so as to render that route impassable.

In the beginning of July 1897, the Sion-Kurla Causeway was kept open for traffic from 12 midnight to 2 a.m., and from 5 a.m. to 8 p.m., foot and vehicular traffic being prohibited at all other hours by a Police guard, except for pass-holders. The staff consisted of 1 Chief Medical Officer, 4 Assistant Medical Officers, 3 Sub-Inspectors, 3 peons, 1 *bhisti*, 1 clerk and 4 watchmen.

On the 7th of September 1897, for the convenience of market gardeners and others, this causeway was kept open from 1 a.m. to 8 p.m., instead of at the hours abovementioned, and this arrangement is still in force. During the whole of the period under report the inspections were conducted in a chawl at the Sion end of the causeway.

In the beginning of July 1897, the Mahim-Bandora Causeway was kept open from 6 a.m. to 8 p.m., but soon after from 12 midnight to 2 a.m. and from 5 a.m. to 8 p.m. (the arrangement still in force), traffic being prohibited except for pass-holders at all other hours by a Police guard. The staff consisted of 1 Chief Medical Officer, 2 Assistant Medical Officers, 6 Police sepoys, and 1 clerk. During the whole of the period under report the inspections were conducted in a shed at the Bandora end of the causeway.

On the 16th of December 1897 detention of passengers from infected areas was commenced on both causeways, which necessitated the following increase of staff: Two clerks and eight Police watchmen for Mahim-Bandora Causeway, and two clerks and six Police watchmen for Sion-Kurla Causeway. To exempt regular passengers from detention, a census was taken

on both causeways, and they were furnished with permits in the following form :—

BOMBAY PLAGUE COMMITTEE.

Not transferable.

Please permit No. ..... name.....to make use of the.....Causeway without detention (if free from plague or other infectious disease dangerous to life) for the month ending.....189 .

M.B., C.M.,
Supdt., Causeway Inspections.

Bombay, ...189 .

Passengers leaving Bombay meaning to return were furnished with metallic tokens on payment of a deposit of two annas each, which deposit was refunded to them on their returning the tokens. Passengers detained were given a meal and sent in batches under Police guards, by trains, to Victoria Terminus on the G. I. P. and Grant Road Station on the B. B. C. I. line, at which stations they were handed to Plague and Police authorities. Many people coming from infected areas refused to undergo detention. These were permitted to go back, but not allowed to enter the Island.

Results.

In all 190 persons from infected areas were detained on the Sion-Kurla Causeway, and 136 on the Mahim-Bandora Causeway, and sent into detention camps. During the autumn months arrangements were made on both causeways for detaining and sending famine-stricken persons into relief camps : 202 persons were thus sent from the Sion-Kurla Causeway, and 225 from the Mahim-Bandora Causeway. During the period under report 62 persons were sent to hospital from the Sion-Kurla Causeway, and 164 from the Mahim-Bandora Causeway.

On the 31st of March 1898, the staff stood as is shown in the following table:—

Sion-Kurla Causeway.	*Mahim-Bandora Causeway.*
Dr. K. M. Hiramaneck.	Dr. Dallas.
Dr. Shamrao Narayen.	Dr. Dordi.
Mr. D. B. Painter.	Dr. Horsedealer.
Mr. B. B. Rele.	Mr. Sanjana.
Mr. P. A. D'Mello.	Mrs. Saunders (for women).
Mr. A. B. Sonalkar, Clerk.	Mr. R. B. Dabolkar, Clerk.
Mr. V. B. Phatak, „	Mr. P. I. Rodrigues, „
Mr. A. M. D'Mello, „	Mr. F. D'Souza, „
Mr. Bomanjee Shapurjee, Sub-Insp.	4 Police sepoys.
Mr. Jacob Solomon, „	10 Watchmen.
Mr. Govind Shankar, „	
Pancham Nunda, Peon.	
Surjee Laloo, „	
Natha Khan, Bhisti.	
8 Watchmen and 2 Policemen.	

A weekly return of the work on each causeway was submitted to the Plague Committee in the following form :—

_____Causeway.

NUMBER of foot-passengers entering and leaving Bombay in the week ending Saturday, the_____189____.

Dates.	Days.	No of persons stopped as patients.	No. of foot-passengers entering Bombay.	No. of foot-passengers leaving Bombay.
	Total ...			

_____C. M. O.,

_____Causeway.

Bunders.

The arrangements for the inspection of passengers and crews arriving by boat at Mahim and Worli devolved upon the District Officer of G Ward, and the duties were deputed to Dr. Dadi Burjor, the Sub-divisional Medical Officer, who discharged them most satisfactorily. During the period under report 250 boats arrived at Mahim Bunder, containing 1,560 souls constituting crews. During the same period 237 boats left this bunder, containing 1,489 souls, of whom 14 were passengers, out of which number 2 were prevented from sailing. Eight hundred and eighty-three boats arrived at Cleveland Bunder, containing 5,900 souls forming crews. Eight hundred and sixty-four boats left this bunder, containing 5,684 souls, 30 of whom were passengers, out of which number 9 were prevented from sailing.

Inward Sea Inspection.

The system of inspecting inward crew and passengers from coast ports which was introduced in April 1897 was continued from the end of June 1897, but on a much reduced scale, owing to the great falling off in the coasting passenger traffic on the setting in of the monsoon.

On the 1st July the Plague Committee's Harbour staff consisted of—1 Commissioned Officer, 2 local qualified Medical Practitioners, 4 Assistant Surgeons, 1 Lady Doctor.

Passengers by the Dharamtar and Ulwa Ferry lines, as well as those by native craft, were examined at Mody Bunder, while those from

the coast between Karachi on the north and Bhatkul on the south were examined on board the steamer on arrival off the Prince's Dock.

At the close of the monsoon, early in September, Messrs. Shepherd & Co. ran their usual number of ferry boats and coasting steamers, in all about 28, weekly. Country craft began to arrive, and to meet the extra work the staff was increased to 7 qualified Medical Practitioners, 4 Assistant Surgeons, 20 Students, 2 Lady Doctors, and 1 Lady Hospital Assistant.

To facilitate the examining of native craft, as well as of the large number of boats which bring vegetables in the early morning for the Bombay market, barges were put out, as before the monsoon, at Tucker's Beacon, Free Anchorage, and Dutiable Anchorage. These anchorages were assigned to the students.

From the 26th September 1897, in consequence of Plague at Cutch Mandvi, Janjira, and the Kolaba District, all arrivals from such places were sent to the Observation Camp. All passengers, no matter from what coast port, were examined on arrival, and all suspicious cases and those suffering from fever were sent to the Observation Wards attached to the camps. The names and temperatures of all these suspicious cases were written down for future reference. Passengers from slightly infected ports were examined and allowed to depart. Only such cases as were suspicious were detained in the Observation Camps, and then only until their temperatures became normal. Passengers from coast ports who were bound for places outside Bombay were, if free from suspicious symptoms of plague, allowed to proceed without detention on the surveillance system. Passes were issued and the counterfoils sent to the Plague Authority of the district to which the passenger was bound.

Owing to the recrudescence of plague in Bombay towards the end of December, the number of passengers from coast ports began to fall off, and many steamers ceased to run.

Detention in Observation Camps of people arriving was given up on 25th January. The staff was reduced to 3 qualified Medical Inspectors, 1 Lady Doctor, 1 Lady Hospital Assistant, 4 Assistant Surgeons, and 4 Students.

Since the middle of March, coincident with the fall in the Bombay Plague mortality, the number of passenger arrivals is steadily increasing, and has reached a rate up to date of over 8,000 a week.

Results.

The following table shows that from July 1897 until March 1898 35,935 steamers and native craft and 481,250 crew and passengers from ports on the coast of Western India were inspected:—

Months.	Vessels Inspected.			Persons Inspected.							Passengers.	
				Passengers.		Crew.		Total.				
	Steam-ships and square-rigged vessels.	Native sailing craft.	Total.	Steam-ships and square-rigged vessels.	Country craft.	Steam-ships and square-rigged vessels.	Country craft.	Passengers.	Crew.	Crew and Passengers.	Segregated.	Plague Cases.
1897.												
July ...	89	943	1,032	9,152	973	3,328	6,517	10,125	9,745	19,870	489	...
August ...	100	1,639	1,739	15,344	2,139	4,287	9,956	17,483	14,243	31,726	919	...
September ...	139	3,772	3,911	37,773	4,584	5,506	22,606	42,357	28,112	70,469	3,565	4
October ...	158	4,749	4,907	31,630	992	5,309	28,849	33,622	34,158	66,780	10,548	4
November ...	156	4,943	5,099	33,464	649	5,429	31,382	34,113	36,811	70,924	9,692	15
December ...	160	5,263	5,423	33,282	1,013	5,439	34,290	34,295	39,729	74,024	9,148	5
1898.												
January ...	181	4,249	4,430	11,811	335	3,427	28,097	11,646	31,524	43,170	2,986	...
February ...	102	4,793	4,895	13,279	209	2,852	32,089	13,488	34,941	48,429	415	1
March ...	121	4,378	4,499	21,595	663	3,919	29,681	22,258	33,600	55,858	461	6
TOTAL...	1,306	34,729	35,935	206,830	11,557	39,396	223,467	218,387	262,863	481,250	38,223	27

Twenty-seven cases of plague were detected or developed among the suspicious cases which were sent to quarantine. These 27 cases came from the following ports :—

Goregaum	1	27 Plague Cases.
Cutch Mandvi	12	
Jaffrabad	1	
Verawal	1	
Malwan	1	
Bankoti	1	
Karachi	1	
Revdanda	2	
Calcutta	1	
Nagotna	2	
Dabhoi...	1	
Mandvi	1	
Other ports	2	

Outward Sea Inspection.

The above statistics do not apply to the outward inspections, which were under the direct control of Government and were carried out by Government servants. During the period from July 1897 until March 1898 inclusive, the Government Medical Staff inspected 35,816 outward-bound vessels and native craft—268,882 crew, 322,051 passengers, or a total of 590,933 crew and passengers. The inspection of outward-bound crew and passengers continued to be very rigorous, and owing to this being known very few cases of fully developed plague were found at the time of inspection; but 84 cases of Plague broke out among the rejected crews and passengers who were sent to the hospitals for observation.

So far as is known no ship bound for a European or a Foreign port had a case of plague on board after her departure from Bombay.

The combined results of the Inward and Outward Inspections are therefore as follows :— **Combined results.**

71,751 Vessels and native craft.
531,745 Crew.
540,438 Passengers.
} Inspected from July 1897 to March 1898.

The inspection resulted in a detection of 115 plague cases.

These inspections were controlled up to the middle of October 1897 by Surgeon-Major MacCartie, C.I.E., and afterwards by his successor, Surgeon-Major T. Crimmin, V. C. **Staff.**

The following is a list of the staff who served the Plague Committee from the 30th June 1897 until 31st March 1898. The list shows the date on which each officer was first entertained :—

Names of Officers.	Period		Remarks.
	From	To	
I.—Commissioned Medical Officers.			
Surg.-Lt. E. F. E. Baines.	21st April 1897	23rd December 1897.	Transferred to Govt.
„ Sealy	24th December 1897	31st December 1897.	Transferred to Plague Committee.
II.—Lady Doctors.			
Mrs. J. Walker	16th May 1897	12th September 1897.	Resigned.
Miss Brennan	13th September 1897	5th October 1897.	
„ Seraphina Dias ...	16th September 1897	31st March 1898.	
Mrs. M. M. Mursban ...	1st October 1897	31st March 1898.	
„ Dadina	8th October 1897	31st January 1898.	Services dispensed with on account of reduction.
III.—Private Medical Practitioners.			
Dr. P. D. Hormusji ...	4th April 1897	31st March 1898.	
„ James Munday ...	5th April 1897	Do.	
„ H. J. Khambatta ...	12th August 1897	26th December 1897.	Transferred to Plague Committee.
„ A. F. Fernandes ...	6th September 1897	Do.	Do.
„ H. C. Munji	Do.	6th October 1897.	Resigned.
„ R. M. Nanji	Do.	4th February 1898.	Transferred to Govt.
Asst. Surg. E. O. Fenwick.	Do.	31st October 1897.	Resigned.
Mr. B. B. Vijaikar ...	Do.	31st March 1898.	
Dr. M. K. Munshi ...	7th September 1897	28th December 1897.	Transferred to Plague Committee.
Asst. Surg. M. G. Carroll.	13th September 1897	30th October 1897.	
Mr. J. B. Munsiff	1st October 1897	31st March 1898.	
„ K. M. Munsukh ...	7th October 1897	Do.	
Asst. Surg. H. S. Tanner.	1st November 1897	15th January 1898.	Resigned.
Dr. D. B. Naik	9th December 1897	6th January 1898.	

Names of Officers.	Period		Remarks.
	From	To	
Mr. S. B. Gadgil	9th December 1897	31st March 1898.	
„ Elijah Moses... ...	Do.	12th December 1897.	Resigned.
„ W. R. Bhat	Do.	28th February 1898.	
„ F. S. Joshi	Do.	31st March 1898.	
„ Ghandhi	Do.	31st December 1897.	Resigned.
„ R. A. Contractor ...	13th December 1897	31st March 1898.	
„ P. K. Kanga	28th December 1897	Do.	
„ B. K. Patel	1st January 1898	Do.	
„ H. K. Madkekar ...	17th January 1898	Do.	
IV.—Medical Students.			
Mr. J. DeQuadros ...	6th September 1897	7th December 1897.	Services dispensed with on account of reduction.
„ J. F. DeMello ...	Do.	Do.	
„ H. C. Hildreth ...	Do.	Do.	
„ J. De Souza	6th September 1897	7th December 1897.	
„ F. D. Gomes	Do.	Do.	
„ K. M. Pardhy ...	Do.	Do.	
„ L. M. Bhatt	Do.	Do.	
„ R. S. Sahasubudhe ...	Do.	Do.	
„ S. G. Paranjpe ...	Do.	Do.	
„ B. B. Khandekar ...	Do.	Do.	Services dispensed with on account of reduction,
„ M. N. Desai	Do.	Do.	
„ P. K. Babrawalla ...	Do.	Do.	
„ A. A. Bastia	Do.	Do.	
„ L. N. Purohit ...	Do.	Do.	
„ H. K. Ranade ...	Do.	Do.	
„ R. D. DeMello ...	Do.	Do.	
„ F. Lauder	Do.	5th October 1897.	Resigned.,
„ M. G. O'Za	Do.	6th October 1897.	
„ G. S. Thadani ...	Do.	12th October 1897.	
„ A. Fielding	Do.	30th November 1897.	
„ J. Apte	7th October 1897	7th December 1897.	Services dispensed with on account of reduction.
„ Mackenzie	Do.	Do.	
„ M. A. Lalvani ...	Do.	Do.	
V.—Other Staff.			
Mr. Blakeman	5th October 1897	31st January 1898.	Transferred to Plague Committee.
„ Ramrao G. Kamalakar, Head Clerk to H. O. P.	1st April 1897	31st March 1898.	
„ G. R. Kulkarni, Clerk to Plague Committee.	1st October 1897	Do.	
VI.—Menial Staff.			
Two peons...	1st April 1897	Do.	

All these officials did excellent work and deserve the thanks of the Committee for the conscientious manner in which they performed an unpleasant duty. All the students worked cheerfully and well for long hours in the harbour.

The Health Officer of the Port brought to the notice of the Committee for special recognition the names of the following officers:—

Dr. (Mrs.) Murzban.	Dr. Hormusji.	Dr. Gadgil.
„ (Miss) Dias.	„ Nanji.	„ Munsiff.
Surgn.-Lieut. Baines.	„ Khambatta.	„ Vijaikar.
Dr. Munday.	„ Fernandez.	„ Munsookh.

The Police and Customs Officers, although not on the Plague Committee's staff, devoted much of their time to duties in connection with the Committee's inspections. The Health Officer of the Port especially mentions the names of Mr. Ingram, Superintendent of the Dock Police, Inspectors Lee-Smith and George, Constables Wheatley, Walton, Hurst, Murray and Perry, and Messrs. Bailie, Thomas, Ainsworth, Walsh, and Pinto of the Customs Department, who rendered assistance without which it would have been impossible to cope with the work of examining the large numbers of crews and passengers who arrived from Plague-stricken ports.

No mention is made of any of the Government establishment whose duty it was to inspect outward bound crews and passengers, who on every many occasions spared neither time nor expense in helping to carry out the work of the Committee.

The subsequent treatment of quarantined cases will be found in the chapter on Camps.

CHAPTER IV.

THE PEOPLE.

In many cases as is well known the people proved themselves alike agents in the dissemination of Plague, and obstructive to remedial measures. Racial characteristics and innate prejudices combined to encourage a more or less perverse attitude towards Plague and Plague measures which with its results can only be briefly indicated here.

The larger movements of the inhabitants into and out of the city have been dealt with in the preceding chapter. By reference to the tables on pages 2-27 *passim*, it will be seen that throughout the period covered by this report there was in every month down to the end of March a very considerable excess of departures over arrivals. This, however, even in the first half of April had been converted into a small excess on the other side (*vide* Table, p. 29). Whether from sullen acquiescence in their long affliction or from quick appreciation of the improvement now setting in, the popular dread of the disease had begun to subside *pari passu* with its virulence.

Internal movement.

But while emigration had been largely checked by fear of detention outside Bombay and by the difficulty of obtaining passes, internal movements from one district of the Island to another had been much resorted to. Any outbreak of Plague in one quarter of the town was followed by the removal of the sick to another; and where several cases took place in a large chawl, or a compound, the neighbouring families would disappear *en masse*. Both these movements largely conduced to the spread of the disease. The sick person was secreted in the house chosen as a hiding place and in many instances the house would only be discovered by three or four deaths occurring in it.

In this way, towards the end of January, Plague was transmitted by some Parsis from the Fort, and after several months freedom from attacks, culminated in one of the sharpest outbreaks of the whole epidemic. As the pressure of the North Fort search-parties increased,

the sick were removed and Dhobi Talao became badly infected. From Dhobi Talao the disease spread north to Girgaum and east to Dhanji Street in Market, where during March it was severe. It is less easy to trace the spread of disease due to the flight of people from an infected chawl. As a rule they fled in different directions and in many cases introduced Plague into their new lodgings.

The measures taken between January and March to keep Malabar Hill and the north of the Island free from infection, and afterwards to encourage residents in the crowded central parts of the city to move into houses or camps in the north of the Island and beyond Bombay in Salsette, have been summarised in the reports of those months.

General behaviour.

From the beginning of July till the end of December, with few exceptions, the people accepted the necessity of Plague measures. In Mahomedan quarters search-parties were occasionally stopped; jeers and hooting, especially among the children, were not uncommon when patients were removed to hospital, and a few cases of stone throwing or assault occurred. These were of no general significance and the arrival of a few Police always restored order. The only opposition to rules which was in any way general, was the persistent concealing of the sick. This practice was commonest among Musalmans, higher-caste Hindus and Parsis. It was rare either among Christians or among middle or lower-class Hindus.

With the spread of the epidemic towards the end of December, the burden of Plague measures of necessity greatly increased. The rapid addition to the number of seizures and the speed with which the disease ran its course, made information difficult to obtain and necessitated more frequent house-searching. This doubtless caused irritation. The more rigid segregation of contacts, the presence of troops, and the increasing difficulty of leaving Bombay added to the uneasiness. The constant fear of death, the frequency of funerals, the going and coming of bands of disinfectors, all combined to increase ill-will and discontent. As weeks passed and the numberless prophecies of the abatement or of the sudden ceasing of the disease ended in disappointment, the general feeling grew more sullen and hopeless. This was shewn by the opposition made to certain proposals for the registration of deaths, which a few months earlier had been considered free from objection.

Large numbers of upper-class Hindus, indeed, who had removed to the north of the Island or to Salsette, remained content and healthy. But many of the caste who could not, or would not, move into camp grew more

and more dissatisfied with the rules preventing free exit from Bombay, and with the restrictions on the issue of passes. The riot of March 9th, though in origin connected with the removal of a young Jullaha girl to hospital, and though in the Nal-Bazaar, Paidhowni, and Grant Road both Musalman and Hindu rioters behaved with great cruelty, was not supported by the mass of the people and was not directed against any particular portion of the Plague measures. On the day of the riot the inspection of corpses was the chief grievance. A few days later, when a strike among cartmen and dock labourers was threatened, the principal ground of complaint was the detention of people who wished to leave Bombay and the difficulty of getting passes. Since the middle of March the enforcement of systematic house-searching, removal of Contacts, and, to a less extent, of the vacating of infected houses has been relaxed. This has combined with the rapid abatement of the disease to remove causes of complaint.

Special behaviour.
Hindus.

In analysing the effect of plague on the different castes of Western Indian Hindus, it is to be remembered that they take their origin from two territorial divisions—(1) Maharastra and Karnatic, and (2) Gujaratha, in both of which the same castes formed by professions occur. The diverse climatic and physical conditions of these two main territorial divisions have their effect on the constitution and character of the inhabitants.

Traders.

In August 1896, Plague broke out among the Hindu traders of the Mandvi division of B. Ward near the Docks. Shravaks, Banias, Marwadis, Bhatias and Lohanas suffered severely. In many cases before any human being was attacked the rats sickened. The houses of almost all the traders in Mandvi have store-rooms on the ground floors which are infested by rats. The religious repugnance of the inhabitants to kill, or even to remove the rats after they had sickened and died, filled the houses with infection. The residents of the upper floors succumbed to the poison. Neither his abundance nor his wholesome sustenance protected the Hindu trader. It is significant that during both the past and the present epidemics in Bombay, upper-class Gujarat Hindus have suffered more than the corresponding classes of Maharastra or Karnatic origin. This is probably due to the want of nervous vigour in the Gujarati's soft fleshy body, and perhaps to the indoor life that many of them lead. Banias took the Plague to the Deccan, where it is known as the Marwadi sickness. They carried it to parts of Khandesh, where it is called the Bania disease. Hindu traders, mostly Gujaratis, conveyed the disease to Karachi in November 1896, and to

Mandvi in Cutch in April 1897. The Bania is the Plague spreader partly, perhaps mainly, because the Bania is the chief traveller.

As has already been noted, the outbreak of the second epidemic in September 1897 occurred, as in the previous one, among the Banias of the Mandvi Section of B Ward. In late December and in January, as the disease became more and more severe, the high proportion of mortality among traders aroused attention. Among Hindu traders, the Jains or Shravaks seemed to suffer the most. According to the returns the proportion of deaths among Shravaks was remarkable, being double the proportion even among low-caste Hindus. This was supposed to be the result of certain special social or religious practices among the Shravaks. It was said that their fastings during the month of Bhadarva weakened their system and consequently made it especially susceptible to Plague. To a certain extent their habits were also supposed to be responsible for the average higher mortality among them. The true explanation seems to be that while in the census of 1891 the name of Shravak with a total of 25,000 is confined to those who are Jains by religion, in the health figures the term Shravak is used loosely to include nearly all Hindu traders except Bhatias and Lohanas. The fact is that the total population represented by Shravaks in the health returns is probably nearer 50,000 than 25,000.

Labourers.

A class of Hindus who suffered severely when the epidemic was at its height were the large powerfully-built temperate Dekhan Marathas, known as Ghatis, who are the great weight carriers in the Docks. These men are often exhausted at the end of their day's work. They have as a rule no families with them in Bombay, and have to wait late for their dinner in their lodgings. Not uncommonly, they have no room, and sleep in passages or in verandahs. They live in very bad localities. In their case an attack often ended fatally a few hours after their return from labour. They did not give in immediately they were attacked, but in spite of the fever stuck to their work, until, completely exhausted, nothing could save them.

Craftsmen.

Among Hindu craftsmen, towards the close of December, a number of Goldsmith or Soni families suffered severely. In January and February the Coppersmiths or Kasars, the Ironsmiths or Lohars of Kumbharwada, as also the Lohars of Lohar Chawl in Market, were badly infected. The Panchkalashis or Carpenters of Girgaum and Gamdevi suffered much in the months of February and March. Craftsmen of each class generally live in one *moholla* or locality. As there are no alien neighbours to give information if

Plague find its way into one of these *moholias*, several families will have sickened before the fact comes to light. Hence the death-rate is high.

In the previous outbreak, the Mochis or shoe-makers, whose practice of living twenty or thirty families in one large room would seem to make them specially liable to attack, were fairly exempt. But in December few, if any, of the shoe-makers' warrens in or off Duncan Road were free from Plague and relapsing fever which, in a considerable proportion of cases, was mixed with Plague.

Fishermen.

The Kolis or Fishermen of Koliwada in Mandvi, Colaba, Mazagon, Worli, and Sion had suffered severely during the first epidemic. In the second epidemic, except for an outbreak among the Colaba Kolis in December, and among the Mazagon Kolis in February, which was carried by fugitives to Worli, the Kolis have suffered less during the present than during the previous epidemic.

The Pardeshis—Hindus of all castes from the North-Western Provinces and Oudh—also suffered severely. The causes of their especial susceptibility were probably their poor food and their living in infected localities, often to guard houses deserted by their occupants through fear of Plague.

The Mahars, Dheds, and Bhangis have all suffered severely, apparently to a greater degree than they suffered in the first epidemic.

Musalmans.

During the first epidemic the Musalmans were on the whole fairly free from Plague. This second epidemic has pressed much more heavily upon them. Among the Konkan and Deccan Musalmans occupying the block of streets to the north of Paidhowni, especially those who live in the streets bounded on the south by Erskine Road, on the north by Bellasis Road, and between Parel Road on the east and Duncan Road on the west, as also in the Chákla quarter, an exceptional mortality has prevailed with considerable steadiness since early December.

The reason for this seems to be in great measure the Musalman dislike of hospitals—even their own—and the consequent attempt to conceal cases by moving the affected from house to house and quarter to quarter. This hurtful practice greatly lessened the patient's chance of recovery, while at the same time it spread infection over the whole Musalman quarter. Further, the Konkan and Deccan Musalmans suffered from the want of any religious or social head who could enforce a profitable obedience to rules. The present Kazis, two in number, each

of them representing one of the two main cliques in the Konkan community, have little influence. They are merely registrars of marriages and divorces, and even for the registration of these contracts they do not possess the exclusive right over the large non-Konkan element in Bombay.

With all these hindrances the intelligent and faithful help afforded to Plague measures by certain members of the Sunni Musalman community, notably by Maulavi Hidayatulla, Khan Bahadur Fazlullah, Messrs. Kazi Kabiruddin, Hakim Muhammad Dayam and others, in some cases at personal risk and loss, was highly creditable.

The Memons, both Kachhis and Hallais (that is, from North-East Kathiawar) have also suffered severely. There are excellent citizens, especially among the Kachhi Memons, who have given willing and intelligent help. But the communities are broken into cliques and the leaders have only a limited authority. The Bohoras and Khojahs have the advantage of strong and enlightened leaders. The Khojahs suffered severely in November in consequence of infection spread by a well-to-do family in Umarkhadi, who brought the sickness from Poona. H. H. Aga Khan enforced the rule of sending the sick to hospitals and advised inoculation, and the Khojahs on the whole have behaved excellently, declaring their cases of sickness and sending the sick to hospital.

Mr. Muhammad Ibrahim Hasham Bhalu, the benevolent Khojah gentleman who opened a Khojah Plague Hospital at Don-Tod Street in March 1897, also opened a Segregation and Contact House on Khodak Paidhowni Road, where at his expense the poorer inmates were supplied with food. Mr. Muhammadbhai also arranged for setting apart a shed or ward for the Khojahs at the Narielwadi Camp, where at his cost food was supplied and bedding furnished to all Khojah arrivals from up-country. Before Mr. Muhammadbhai's private hospital was started, a Khojah Subscription Hospital was opened near the Victoria Gardens. This was under the supervision of Mr. Ismail Jan Muhammad, but owing to its distance from the Khojah quarters of the city, it was not a success. It was closed on the opening of the Don-Tod Hospital.

Under the Head Mula Saheb and Mr. Adamji Pirbhai and his sons, Messrs. Muhammadbhai and Abdul Hussein Adamji, the Bohoras, in spite of their notable fondness for secrecy, have declared their cases and moved the sick and a large proportion of the contacts to Mr. Adamji Pirbhai's excellent sanitarium in Queen's Road, which was set apart as a Plague Hospital and Segregation House. The name of Mr. Hasan Ali and his success in persuading his fellow Bohoras to take their sick

to hospital will be remembered by all who took part in Plague measures in Khara Talao and other sections of North C Ward.

Parsis.

The Parsis suffered considerably during the second epidemic. A few stray cases, some of them doubtful, occurred in the Fort and in Chaupati in August and September 1897. But the Fort remained healthy till about the middle of January 1898. It was believed that the Parsis in the Fort were in almost all cases attended by medical practitioners and that the families or the medical attendants would at once give information of any case of Plague. This expectation was not realised. During the latter part of January, the high death-rate in Fort North attracted notice and several concealed cases were found among the Parsis. When it was known that search-parties were at work in Fort North, several sick Parsis were secretly conveyed to houses in the Marine Streets of the Dhobi Talao district. In consequence of this disregard of rules the Marine Street Parsis suffered severely.

So soon as the presence of Plague in the Marine Streets could no longer be concealed, search-parties were at once at work. To avoid these parties, the Parsis secretly moved their sick to Breach Candy or Girgaum Road and spread Plague north along Girgaum Back Road, where it worked severe mischief. How far the Parsi Plague-current was the only element in this serious evil cannot be determined. That it was the main element is beyond question. Between the 18th and 24th February, from the Marine Streets in Dhobi Talao, infected and Plague-stricken Parsis moved to Nos. 4 to 6, Dhanji Street, the street which runs south from Mumbadevi Tank. In this large colony of poorer middle-class Parsis, up to the middle of April, when Plague was dying in the neighbouring sections, fresh cases of a severe type continued to spread terror. Although the Parsis have, as indicated, on occasions caused the spread of plague by neglect of established rules and facilitating concealment, they have shewn foresight and energy in building hospitals and camps and good sense in using the hospital accommodation, and in willingly turning out of their houses into camp. The Parsi Panchayat Hospital on Parel Road, under the management of Dr. Bahadurji, has proved a success.

When in the end of January the epidemic was most severe among the Parsis of the North Fort, the Parel Road Parsi Hospital was full. It was also at an inconvenient distance from the houses of Fort patients. It was urgent that in order to overcome the Parsi dislike of allowing a patient to leave his home, a hospital or ward of their own should be at hand. If a ward easy of access were made available, the friends before moving the

patient might visit the ward, and afterwards could easily attend on him. There was the further urgency of freeing the Fort from Plague.

One of the main hopes cherished by the Committee was to keep Plague within limits, which would prevent the dislocation, or even the disturbance of the general trade of the city. No evil could be more fatal to trade than to allow the spread of Plague in the heart of the city, where its entire business activity centres.

With these ends in view, an additional ward was built in the Modikhana Hospital, and under the close personal attention of Mr. N. M. Wadia, C.I.E., and of Mr. M. M. Murzban, the ward was supplied with every comfort and was at once filled. This was unfortunately destroyed by the fire of February 21st. The patients were safely conveyed to the Seth Sanitarium in the Fort, where, through the kindness of the Trustees, they were allowed to remain for a few days till arrangements were made for their comfort in Modikhana Camp. Two of the patients were taken to the Parsi Hospital on Parel Road. Almost all the rest of the patients returned to the Modikhana Camp, and about three weeks later, when the Modikhana Hospital was re-built, by the generosity of Bai Dinbai Nusserwanji Petit, the Parsi ward for acute cases, together with wards for observation cases, for convalescents, and for nursing friends, were all fully occupied, but since then Plague among the Parsis of the Fort has nearly ceased, and since the beginning of April the ward has never been full. Still, under the constant personal care of Messrs. Wadia and Murzban, it has remained a great safety and comfort.

It was not expected that Parsi families who are accustomed to houses full of furniture and ornaments, would agree to camp in ordinary huts. The Panchayat therefore built a costly type of hut, one for each family, each having two living rooms, a cooking and a bathing room. These huts on the Kennedy Sea-face were bespoken before they were finished. With the exception of one case of Plague, the families who moved into them have enjoyed unbroken health, and many families would at once move into camp if dwellings of a similar class were available.

Christians.

Goanese.

Christians, that is, the mixed descendants of old Portuguese Settlers either of Goa or of Bombay-Salsette, have suffered severely. They fared badly during the first epidemic. During the second they fared worse. In Cavel, in Girgaum, in Dhobi Talao, in Dukar Gully and Burrows' Lane in Phanaswadi the number of deaths, both among the poorer and the richer Christians, has been grievous. Among these Christians one main flow of infection came though the nurses and other servants in the houses of rich Parsis. Many of these who contracted Plague during the discharge of their duties had to leave their masters' houses and died

in their own *koors* or clubs. There were doubtless other sources of infection, and when human *vahans* or carriers were guarded against, Plague rode in on a sick rat.

No one who has seen the working of Plague measures will withhold respect and admiration from the conduct of the Christians. Whoever the patient, and however well and dearly cared for at home, if the case was declared Plague or suspicious, wife, daughter or son were willingly sent to the hospital and all arrangements for Contacts and for disinfecting were submitted to without a murmur. At first Christian patients were sent to the Grant or Arthur Road public hospitals. In March a movement was started by Dr. Da Gama to have a ward set apart for Christians, so that the last rites might be ceremoniously performed in private. A ward was allotted in the Narielwadi Hospital which, in spite of the great decrease of the Plague, has ever since held a few patients. An arrangement was made to open a Segregation Camp on the grounds of the Ashburner Bungalow at Mazagon. Huts were built, but the decline of the disease made their use unnecessary.

Bombay-Salsette

The second Christian community, the Bombay-Salsette Christians, made proposals regarding a special hospital and segregation house, but they took no action till the decline of the Plague made special arrangements unnecessary.

Jews.

The Jews have passed through the Plague fairly unharmed. The few rich European Jew patients have been received into the European Plague Hospital; the poorer Baghdadi Jews have shown a courage and devotion in sending their sick to the public hospitals which has earned the thanks of the Plague Committee. With a little persuasion the bulk of the people have conformed to all Plague rules. Apparently their freedom from concealing cases and their readiness to have infected places cleansed has benefited them. In late December and early January, especially in Nagpada near Mastan Tank, many families of Baghdad Jews suffered. Since the end of January, however severe the epidemic has been in their neighbourhood, Jewish houses have been safe. The local Beni-Israels, or Bombay-Konkan Jews, have had a rather large proportion of cases. They have built an excellent camp-hospital at the east end of the Connaught Road and have sent their patients thither with good results. The Beni-Israels stand high in the rank of communities whose behaviour throughout the Plague has been honourable and helpful.

Chinese.

The small community of Chinese as a precaution built an excellent hut hospital on Connaught Road; but as no Plague occurred among the community, the hospital has not been used.

CHAPTER V.

DIRECT METHODS OF COMBATING PLAGUE.

The aims set before the Plague Committee were to keep down the death-rate while preventing panic and trade dislocation, and to lessen the risk of a third epidemic. **Aims.**

The transference of the Plague-stricken to hospital, followed by their return as convalescents, and the proved protective effects of house disinfecting, combined in a great measure to allay panic and mitigate commercial disaster. It is true that high wages, a certain familiarity with plague, the difficulty of leaving Bombay, and the knowledge that plague ruled in the Mofussil as well as in the City, combined to make the mass of the people unwilling to move. Still it seems reasonable to suppose that, if the death-rate had risen from the actual maximum of 230 a day to 1,500, the Sholapur maximum on the Bombay basis of 750,000 people, or to 650, the Poona and the Karachi maximum, or even to 330, the maximum of the previous Bombay epidemic, no temptation of wages, no discomforts of detention would have prevented a flight from Bombay which would have paralysed the trade of the city.

To lessen the risk of a third Plague epidemic in Bombay, in addition to the removal of the sick, the segregation of the tainted, and the cleansing of the house, special attention was paid to the construction of camps as a relief from overcrowding, to the vacation of infected and unwholesome houses, and to the introduction of an improved provision of light and air.

Apart from the cleansing of streets, the flushing of gullies, and the other general preventive measures which were efficiently carried out by the Health Department, so far as pure Plague operations are concerned the main hope of a low death-rate lies in securing the removal to hospital of the sick at the earliest possible stage of the attack. The means adopted by the Committee to secure the early removal of the suffering were—information, simple house-searching, and house-searching with cordons.

At the stage in the development of an epidemic of plague when cases are few, scattered, and mild, and in places where no law is in force **Information.**

requiring the declaration of sickness, early information of seizures is at once the least irritating and the most efficacious means of discovering cases. With patience and discretion valuable information can be generally obtained not only from the employés of the Plague staffs but from sepoys and peons, and from anxious or needy neighbours. And when trust is inspired, much assistance is given by rent-collectors, medical practitioners, and caste-leaders. Efforts were made to encourage a system of information which would give knowledge of cases of Plague before they ended fatally, and before the patient had passed into a hopeless condition. During the rainy months and till December in certain parts of the city, notably in C Ward, the efforts to secure information were highly successful.

The Committee's efforts to remove the sick were hampered by the concealing of cases. To dissuade relations from hiding their sick, the influence of members of their community, and the counsel and orders of their religious and social leaders were in many cases of great service. The opening of caste or community hospitals, with the attractions of quiet and privacy, where friends could attend, and where the chance of recovery was greater than at home, in many cases overcame the passion for concealment.

Death registration.

Nevertheless during the past ten months the efforts to conceal Plague cases and deaths, with the object of escaping house disinfection, segregation of contacts, and other unavoidable annoyances, have been very successful and have to a great extent been due to the imperfect registration of the house of death.

During the past epidemic in a large proportion of daily deaths, perhaps in one-fourth of the whole, the place of death has not been recorded in the cemetery returns with sufficient clearness to enable the case to be traced. To remove this serious flaw in the registration of deaths in connection with Plague operations, three suggestions have been made:—

(*a*) To require the notification of sickness.
(*b*) To enforce corpse-inspection.
(*c*) To secure the correct address at which death took place.

As regards (*a*);—compulsory notification of sickness is open to the objection that either every case of sickness must be notified, a requirement which would press heavily on the mass of the people, or that, if the notification is limited to cases of Plague or other epidemic disease, to secure conviction for default it must be proved that the patients' relatives were aware of the nature of the complaint.

As regards (*b*);—corpse-inspection has been successfully enforced both in Poona and in Karachi. The objection to its introduction

into Bombay is that, if the inspection is made at the cemetery, a false or a vague address would, for all contact and disinfecting purposes, make the information secured by the inspection of the body useless.

Even corpse-inspection in the house of death is open to the objection that in 20 to 30 per cent. of Plague cases none but highly-trained Medical Officers can tell the cause of death; and that in Bombay, except at a most serious cost, no staff of sufficiently skilled Medical Officers numerous enough to attend all deaths, at all hours, without undue delay, can be provided. In so large a city as Bombay the question of delay in examining the body is serious. Few communities perhaps would object to the examination of a body immediately after death. On the other hand, if the inspection be delayed till after the formal laying out of the dead, serious opposition is to be expected from almost every class of the population.

As regards (*c*), to secure correct addresses, the Plague Committee proposed that no corpse should be removed from the house of death without a Plague Authority's certificate of the correctness of the address. To avoid the detention of funerals at the house of death, large numbers of Plague Authorities, capable of issuing address notes, had to be provided; and to avoid delay at the cemetery, in the case of funeral parties who came unprovided with addresses, it was proposed that a member of the party might be detached to point out to a sepoy the house of death. Before the machinery was in order, the necessity of ascertaining the cause of death in cases of Plague was again urged. The heads of communities were summoned to consider the best means of supplying the required information. It was agreed that no corpse-inspection should be attempted, and it was arranged that in cases attended by practitioners the cause of death should be shown, and that in other cases a note of the place of death would suffice. Notwithstanding this settlement, a report was circulated that a rule requiring the inspection of corpses was about to be enforced, and, in spite of explanations, this received ready credence, especially among the lower-class Musalmans.

In the riot of March 9th, the intention to enforce corpse-inspection was the main complaint brought against Plague measures. By the middle of March, the arrangements for securing the record of a correct address were completed, and the system was introduced. At this stage the Municipality took exception to the system on the ground that the detention of any member of a funeral party was likely to cause irritation, if not disturbance, and that a regiment of police would be required to enforce the rule. To this objection the Committee replied

that, if the proposed system worked, the cases would be rare in which a funeral party would arrive at the cemetery without the note of address.

The present position is by no means satisfactory. The handing to Volunteer Committees of the duty of giving information of cases of Plague was, to a great extent, justified by the check on their working which complete registration returns would supply. Without an adequate cemetery or other registration check, the risk of Plague cases and deaths remaining unreported must continue to be serious.

Search-parties. The best source of information, since it is free from the liability of abuse, is from a Justice or other respected and trustworthy volunteer who knows his beat and his people so thoroughly that he at once hears of any case of suspicious sickness. This ideal form of information is difficult to secure. Probably only one Justice in Bombay—Mr. James Macdonald, of the Byculla Schools—has during the past year known every case of local or of imported sickness in his beat.

As all other sources are imperfect, house-to-house searching, except when cases of Plague are few and imported, becomes necessary. Well-conducted searches, where the medical or other officer in charge is kindly and considerate—and to this kindliness the exceptions are few—in ordinary circumstances cause little or no annoyance. In nine cases out of ten, except when a patient has to be hid, the search-party is a source of amusement rather than of alarm or dislike.

The lampman, the lockman, and the sepoy at times cause crowding and confusion. Still so long as the disease is not virulent and a weekly search suffices, no appreciable irritation is caused. During the virulent stage of an epidemic, when the course of the disease as a rule does not exceed three days, a half-weekly search is required, and such repeated intrusions are apt to breed annoyance.

This method however has necessarily been principally relied on for the detection of cases, and has been in operation from the earliest days of the Plague Committee's operations. In each district a number of parties set out each morning about 7 o'clock to search houses in each section or sub-section. They continued the work till 10 or 10-30 a.m., and again in the afternoon from 3 o'clock until dark. These parties were somewhat variously constituted, but in the main consisted of—

(1) A qualified Medical man, either European or Native.
(2) A Lady Doctor or Nurse.
(3) A Sub-Inspector.
(4) A locksmith.
(5) Two lampmen.
(6) Two or more Police or Military sepoys.
(7) A hand-lotion carrier.

If possible, the services of a local Justice of the Peace or volunteer were obtained to accompany the search-party, but this was often difficult. In most instances an ambulance accompanied the search-party, or was kept in readiness at some convenient point. The District Officer and the officers in charge of sections and sub-sections went round with one or other of the search-parties.

The method of procedure was for the party to start from the District Office at 7 a.m., and proceed to the streets which it had been previously arranged to search. The houses were systematically searched down both sides of the street, the party dividing into two for the purpose. On entering a house, sepoys were stationed at the doors to prevent people leaving until the search was completed. Each room was looked into, and, if necessary, entered, and all the occupants scrutinised. Any persons looking suspiciously ill were carefully examined and their temperatures taken. Persons suffering from chronic disease were granted a certificate by the Medical Officer, the production of which freed them from examination by subsequent search-parties. If a room was locked, the lock was opened by the locksmith, a Police sepoy being present to witness that nothing was stolen and that the room was subsequently locked. Locked rooms which had once been examined were sealed. When the owner returned he went to the District Officer, who sent an Inspector with him to see the seal broken and the room entered. In the houses of Mahomedans, rooms occupied by women were entered only by the Lady Doctor or Nurse, who examined the inmates.

When a case was detected, an ambulance was sent for and the patient was despatched to hospital in charge of a Police sepoy, who took with him a form filled in by the Medical Officer giving the address, age, sex, caste, and condition of the patient and the name of the hospital to which the patient was to be taken. He returned with the ambulance and brought a receipt from the officer in charge of the hospital. Previous to the patient's removal the friends were asked to what hospital they wished to have the patient sent, and, if they showed no preference, he was removed to the nearest general hospital.

Considerable ingenuity was shown by the people in concealing and removing cases while the searching was in progress. One of the objections to this systematic house-visitation was that, on work being started at one end of a street, the people living further down, seeing beforehand what was in store for them, took the opportunity of removing their sick before the party reached their house.

Great care had to be exercised in searching holes and corners of houses to avoid overlooking hidden cases. Lofts, privies, and unoccupied rooms were favourite places for the sick to be stowed away in during the search; but many instances of greater ingenuity in concealment were brought to light, such as covering the patients with clothing, locking them in cupboards or chests, and placing them under beds.

Military cordons.

When in the beginning of January Plague began to get out of hand, and the systematic hiding of the sick made the ordinary house-to-house search fruitless in sections of the worst infected parts of the city, where the death-rate was high and the cases taken to hospital were few, it was considered advisable to cordon the areas with troops at an early hour of the morning, and after making arrangements for the passing out of such of the healthy as were anxious to go to their work to have all the houses searched.

It is to be admitted that these 'cordoned' searches were not so fruitful of cases as they should have been. It is difficult to keep secret the area to be cordoned. It is difficult to baffle the people's determination that the sick shall not be found out. Whether through secret communications from house to house, or by passing them across gullies, it is beyond question that on several occasions badly infected cordoned areas were carefully searched and disproportionately few cases discovered.

Contacts.

The first line of resistance having been broken by the removal of undoubted Plague cases to the safe environment of a hospital, it remains to deal with those persons who have lived in the same room or house with the patient, and who have been in such close association with him that it is highly probable some of them will develop Plague before long.

These persons are designated "contacts." They with their clothes, bedding, and movable property are sources of incalculable danger to other persons both near and far. If left alone they may develop the disease in their already infected houses, and so intensify the existing conditions of infection; they may scatter and develop the disease in fresh quarters of the city, or they may carry infection on their persons or with their belongings to their next place of refuge, provided the conditions for the development of the virus are favourable there.

Contacts are therefore treated on the same lines as Plague cases, and are removed with all their belongings to a Contact Camp, where they pass through a complete process of disinfection, which is applied to their persons, clothes and movable property, after which they enter the Contact Camp. If Plague cases appear among them, these

are again removed to a hospital and the same measures for elimination and disinfection are again applied to those who have been closely associated with them, and who are therefore designated Re-contacts. This process is again repeated until it is found that Plague has actually been dispelled—a result which is usually attained within the first week, the majority of Plague cases amongst Contacts occurring within the first four days.

Having thus disposed of the evident sources of infection, an attack on the next line of resistance follows, namely, on the infected room or house, and this, is done by the several agencies of fire disinfection, limewashing, ventilation, and exposure to sunlight and air. **Disinfection.**

In a crowded city the application of fire, the only certain agent for the complete destruction of infective matter, is applicable to only a limited extent. For general purposes we have therefore to rely upon chemical disinfectants. A collation of the several authorities who have reported on their experience and treatment of Plague, shows that of some six or seven proposed disinfectants Perchloride of Mercury commands by far the widest use.

The Committee have therefore continued to rely upon Perchloride of Mercury as the most effective and powerful disinfectant they could use for treating houses.

A note on this subject will be found in the Appendix.

The work of disinfecting, chiefly with perchloride, is as a rule begun immediately after a case is removed. On the following or on an early subsequent day, the disinfecting is completed by limewashing. From July till the close of December, special officers with separate staffs were employed solely in disinfecting. In January, when it became possible to strengthen the district staff and subdivide charges, each District Plague Officer was again given entire control of all Plague measures in his district. This arrangement worked with remarkable success in South C Ward, where, amongst the men of the Durham Light Infantry, Major Ross possessed trained disinfectors. In other districts also the system worked well.

So far the disinfecting seems to have been thorough. Since disinfected dwellings have been re-occupied, few cases of Plague are known to have occurred in disinfected rooms. Disinfection however cannot prevent fresh infection from outside. Rats or men may re-infect a thoroughly disinfected house. Still, the results support the view that, apart from actual re-introduction of the disease, disinfection is a valuable protection against a fresh outbreak of Plague.

Limewashing.

Limewashing in advance of the Plague was practised during the first epidemic. The arrival of infected persons and kit from other parts of the city may in many cases negative the good results of this precaution. Still, when in February Plague repeated its former progress northward, it seemed necessary to carry out disinfecting operations in advance of the disease. Towards the middle of this month a special body of limewashers and disinfectors under Mr. Atkinson passed through the whole north of the Island, except a small section of Mahim, and cleansed the houses. For a time the result seemed satisfactory. But during April the progress of the disease over most of the north of the Island throws doubt on the success of the operation.

It is most important that all water sources be closely inspected, not only in already infected districts, but throughout the entire neighbourhood. Water connections of which any suspicion are entertained should be cut off pending investigation, and a general inspection of all water connections should be at once directed.

Systematic limewashing of all premises evidently in need of it, even when there is no infection; a regular inspection of latrines, drains and wells; the removal of kutchra, and the free use of a flushing engine, are operations the timely introduction and regular performance of which will prove a great protection against the spread of the disease, if not against its outbreak. It is therefore incumbent upon the Health Department of an infected city to prosecute such sanitary measures with redoubled energy, shoulder to shoulder with the special operations of the Plague Authorities. Some of the Medical Officers have raised a scientific question, as to whether limewashing is advisable in Plague-infected quarters, because the bacillus developes in alkaline solutions; but it must be remembered that hot slaked lime is a caustic solution and that limewashing is only used after other means of disinfection, and is invaluable for sweetening and brightening up the rooms. No evidence is forthcoming to substantiate the doubts above referred to, except the statement that two or three limewashing coolies have contracted Plague.

Disinfecting Staff.

All disinfecting operations were carried out by a special disinfecting staff, and the standard section of the staff is a squad consisting of—

100 Coolies, 4 Muccadums, 1 Mistry and 2 Store Clerks,

working under the direction of a European Inspector.

The staff of each district was organised according to the requirements of the District Officers.

Later on, when the stress of the epidemic was great, this work was largely carried out in most of the districts by a departmental arrangement. In B Ward the original system has been maintained throughout. The staff were distributed on the two branches of work—disinfecting proper and cleansing houses, and limewashing.

Disinfecting Classes.

In Government Resolution No. $\frac{5603}{3592\text{-P.}}$ of 14th October 1897, Government ordered Collectors of Districts to select certain men to proceed to Bombay, Poona, Surat, and Ahmedabad to receive instruction in disinfecting clothing, building, &c. In forwarding the orders of Government to the Chairman, the Surgeon-General stated that he thought these men should be taught also to prepare the different standard solutions of disinfectants. These men were accordingly sent at first to the District Medical Officers for instruction, but as those officers found it impossible to give sufficient time and attention to the matter, it was decided to start a special class, and the Municipal Commissioner was asked to lend the services of Mr. T. G. B. Atkinson, Chief Inspector of Roads, to give instruction in disinfection as he had had an extensive and practical experience of this work both in Bombay and the Mofussil. This was kindly arranged by the Municipal Commissioner, and intimation was sent to Government that the Committee was ready to give instructions at once.

Statement showing the Districts which sent out men to learn Disinfection Work.

	Districts.	Number of men.
1.	Khandesh	85
2.	Ratnagiri	42
3.	Thana	50
4.	Kolaba	20
5.	Nasik	1
6.	Bombay—	
	Public Works Department	8
	High Court	1
	Collector of Bombay	49
	Kanara	5
	Total ...	261

Vacation of Houses.

When many cases of Plague occur in a house, a large chawl, or in a group of crowded dwellings, or when the conditions of such dwellings are so insanitary as to invite outbreak of Plague, the complete vacation of such dwellings, and the removal of the inhabitants together with their property to a Health Camp, after the Contacts have been set apart, is a most effective mode of attack on the epidemic.

Such tenements, of all sizes, lay spread throughout the whole City from Colaba and Fort to Parel, and even in Malabar Hill, in every stage of dirt and decay. Kamathipura, a notoriously evil district, both in the first and in the recent epidemic, shared with Tardeo, Dongri and Bhuleshwar,

the worst proportion of pestilential dwellings, and the greater part of notices to vacate within 24 hours had been served in these districts.

Accordingly (4th January 1898) a new organisation, dealing solely with the removal of tenants from badly infected houses under the orders of the Plague Committee, was set on foot under Captain Betham, 8th B. I., and Lieuts. Mason, Mansergh, and Henderson, R.N., and Mr. T. Jenkins, R.N.

In preparation for the reception of Evicts, camps were formed for the several wards—at Elphinstone Bridge, Byculla, and Connaught Road, Foras Road (Rao Saheb Ellapa Ballaram's), the Kennedy Sea-face, and to the south of the Goculdas Tejpal Hospital. The houses especially to be vacated were those which held many cases last year, and which continued to supply them this year, and to these the attention of the vacating officers was addressed. Under the rules of vacating, persons evicted and removed to the Evicts' Camps were detained for 14 days; after which they were permitted to return to their old houses, if fit for habitation, or to proceed elsewhere.

The erection of Private Camps by persons and firms employing large numbers of employés was encouraged as much as possible, and camps of this nature to accommodate 28,000 people were built.

The Public Health Camps constructed or in progress, would have accommodated 30,500, and allowing for an average stay in camp of 14 days, if the active operations for eviction begun on the 1st of March had not been disturbed by the riots of the 9th March, a total of over 150,000 people would have been passed through the public health camps before the earliest possible fall of rain.

The following account of the system employed in the vacating of houses is contributed by Lieutenant G. W. Mason, R.N., whose services in this matter have been of especial value.

"In every ward in Bombay a record is kept of the number of deaths and cases of Plague which have occurred in every house in that particular ward.

"On reference to this record, should it be apparent to the District Medical Officer that a house is in an insanitary condition, he communicates with the District Plague Officer, who, with the approval of the Plague Committee, informs me that the house in question is to be vacated.

"On receipt of this information I at once make arrangements with the Officer Commanding 8th Bombay Infantry, and with the District Superintendent of Police, to have a sufficient number of men at a

rendezvous (conveniently near the situation of the house to be vacated) at 7 o'clock the next morning.

"On arrival at the house I post a certain number of men in position to prevent the inmates from escaping, for, if they did so, the efforts to limit the infection would be ineffectual.

"The Police sepoys next procure bullock carts, and then the Military sepoys are sent into the houses to assist the inmates in packing up and removing their furniture.

"Previous to this I myself have sent for the landlord, gone round with him and explained the reason for vacating the house, expressly impressing on the inmates the fact that *there will be no quarantine*, and that no restriction will be placed on their liberty to come and go from the camp to which they will be temporarily sent.

"The people are then removed to one of the camps erected for the purpose of receiving evicted persons, in charge of a Military guard, and their numbers are checked by the Camp Master.

"The houses are then thoroughly disinfected and limewashed, and the tiles removed from the roofs.

"After a sufficient period of time has elapsed (in the District Medical Officer's opinion), the people are taken back to their old houses.

"During the period I have been engaged on this work, I have evicted over 8,500 people and have never (with the exception of some cases among the Jullahas) met with the least opposition; my object having always been to carry out the work with the maximum of despatch and the minimum of friction."

Ventilation and improvement of houses for re-occupation.

When a house was vacated, it was at once surveyed with the object of improving its sanitary condition, so that when the poor inhabitants had finished their time in the Health Camp, they might return to a thoroughly disinfected, cleansed, well-ventilated and healthy dwelling. The first operation undertaken in each house was generally the opening up of the ends of passages so as to allow of air passing freely through them. This generally involved the demolition of a room at each end of each passage. Openings about 3 ft. by 3 ft. were made in passage floors and grated over, allowing an upward draught of air from one floor to another, and the roof-cover of the top passage was either provided with side ventilation or with small circular ventilators. In each room an open grating was inserted above the doorway; windows were enlarged

where necessary, and, wherever possible, latrines were separated from the house by an air space made by cutting walls or floors. After these structural alterations had been completed, the houses were whitewashed and cleansed.

The Committee however accepted the position that the improvement of houses rested in the first place with the Municipality. Whatever their legal powers, the Committee held that it was in practice undesirable that they should deal with dwellings which, however ill-kept and insanitary, had remained free from Plague. The Committee held that in the case of houses in which Plague had occurred either in the 1897 or in the 1898 epidemic, their power extended to declaring the tenement unfit for human habitation. Many houses, whose actual defects in the supply of light and air made the letters U. H. H. a true description, were given a last chance. This concession was not more in the interest of the landlord than of the people, as if any considerable number of evil houses is labelled U. H. H., then so soon as conditions favour an influx of labour, the dwellings fit for human use must become more overcrowded than ever.

The probability also that, when the work of the Improvement Trust begins, a large number of tenements will be cleared away, made the Committee unwilling, except as a last resort, to label a house unfit for use. The advisability therefore of removing partitions, cutting lateral and vertical openings for light and air, &c., was pointed out to the landlords as the last chance for many unwholesome houses. In Nowrojee Hill Street, Dongri, where hardly a house escaped Plague, either in the first or second epidemic, the changes pointed out by the Committee were, with few exceptions, made by the landlords, and the improved houses are again occupied.

Though in Dongri this arrangement succeeded, it was evident that to place the whole burden of the changes on the landlords must entail great delay. To provide for the rapid completion of necessary changes on a large scale the Committee secured the services of a company of Sappers under Captain Swayne, R.E., Executive Engineer, Military Works. Progress however was almost immediately stopped by the Municipality who raised the question whether, under the epidemic rules, the Plague Committee had authority to carry out or sanction house improvement. The Municipality held that all such changes belonged to them as they had passed rules, without conformity to which no Plague-stricken or otherwise unwholesome house could escape destruction. The matter has been referred to the decision of Government. Meanwhile the Plague

Committee have been forced to abandon their scheme for improving an appreciable share of Plague-stricken houses.

One measure for letting light and air into unwholesome houses has been carried out on a large scale—the untiling of roofs. In certain cases to give them a chance of escaping the verdict U. H. H., very unwholesome or Plague-stricken houses have had the whole roof stripped and the worn and probably infected tiles destroyed. As a rule, enough light and air are let in if a strip 3 ft. in breadth of the tiles be removed from ridge to eave and stored on the roof. This treatment is of undoubted advantage in one-storeyed tenements. In high houses, unless Plague has been specially fatal in the attics, which is not uncommon, no great result can be expected from the stripping of tiles.

House cleaning.

Even with the greatest care and expedition only a small proportion of the people whose dwellings urgently require disinfection and cleansing can be moved into camp. For the rest, that is, for the mass of poorer townspeople, some treatment, less complete and satisfactory than a fortnight in camp, must be provided. Dwellings, slightly infected and the construction of which is fairly sanitary, need not be kept empty beyond the time required for actual disinfection. The inmates of such dwellings should be sent to one of the Ward Camps. They should undergo on admission washing both of themselves and of the clothes in actual wear; the rest of their clothes and the bedding should be sterilised by steam, and if no case of Plague occurs they should be returned to their houses at the end of five days.

One class of houses remains—dwellings not situated in thoroughfares, of fair construction, which, though they have been free from Plague, are in an unclean and unwholesome condition. In the case of these dwellings, now that the cold season is over, it seems sufficient to clean out the house, to disinfect or simply to limewash every part of it, leaving the lodgers and their kit to spend out-of-doors the one, or at most, the two nights required for the house-cleaning. Rags should be burned. If it seems necessary, all padded clothing and bedding should be packed in sacks and sent to the nearest steam steriliser. During the house-cleaning the people should be made to bathe and lay out their wearing clothes in the sun.

Results.

It may be admitted that the results of the Committee's efforts have fallen short of the objects they hoped to secure. The total deaths rose from 3,794 in December to 6,886 in January and to 8,316 in February, and, in spite of several temporary lulls, reached a total of 9,210 in March. The pressure of the special measures required and enforced to check

this grievous mortality roused a feeling of unrest which, if not the cause, was at least the excuse for a riot. This may be admitted. Still the efforts of the Plague Staff to withstand the force of the epidemic command respect.

That during the six weeks before the middle of March on an average 2,951 houses were daily searched and 106 Plague cases daily discovered and taken to hospital; that on an average 100 deaths out of a daily recorded Plague mortality of 195 took place in hospital, that 88 Contacts were daily placed under surveillance in camp and about 200 (as attendants on their friends) in hospital; and that 161 infected dwellings were disinfected and 78 were vacated, the bulk of them being large buildings, is a remarkable record.

It may be urged that though the measures were sensible and the amount of labour expended in enforcing them was creditable, they were carried out in a manner so harsh that discontent ending in riot was the natural outcome. In reply it is to be noticed that no considerable amount of formulated or even of genuine grievance against the Plague Committee and its measures has been brought forward either at the time of the riot or since. Among over a thousand limewashers picked off the street at day wages, a rough element is inevitable. Yet only one band disgraced itself by horseplay and extortion. In emptying over 3,200 houses in six weeks, entire freedom from breakage and damage to property was impossible. Instances of misconduct under several heads may be admitted. At the same time the rarity of such instances seems to follow from the almost complete absence of complaint, though every opportunity to complain has for weeks been offered to the whole population of Bombay.

It may be held that the comparatively few and, as a rule, easily explained complaints which this opportunity has brought to light show a high standard of conduct not only among the disciplined soldiers and sailors on Plague duty, but among the temporary Plague Staff, and at once reflect credit on the men employed and on the officers who controlled them. That a staff over 2,000 strong, more than half of them day-labourers or employed by the month, should for nearly a year carry out on so large a scale duties almost all of them unpopular, and that at the end charges of misconduct should have been so singularly few, may be considered honourable to all employed and a legitimate cause of satisfaction to Government.

CHAPTER VI.

CAMPS.

Since August 1897 one chief object of the Plague Committee has been to provide abundant and healthy accommodation in camps, both for infected arrivals and for the evicted dwellers of tainted and unwholesome buildings in Bombay.

Experience in previous epidemics, both in Bombay and in the Mofussil, has shown that the most efficient means of keeping Plague in hand is to remove people, as much as possible, from infected areas into camps, where the outdoor life and the healthy fresh air not only keeps them free from the disease but also greatly improves their general health. For this reason the Committee encouraged Private Camps in the case of the well-to-do, and constructed Public Camps on available open spaces in and about the City, in which to place the indigent.

To secure health in any Bombay Camp, especially in the low-lying sites which are often alone available, special care must be taken to provide not only a liberal, carefully designed and closely looked-after system of latrines, but buckets or other appliances for storing and carrying off slops and cooking-water, and drains and runnels for the removal of bathing water. Large amounts have been spent on these appliances, but the healthiness and popularity of the camps justify the outlay.

Protection against fire has also caused a large expenditure, which could not have been avoided without running unjustifiable risks. It is remarkable that though all the camps are made of matting and palm-leaf, only two fires have occurred. One of these, at Modikhana Camp, was the work of an incendiary who threw a lighted cheroot on the thatched roof of a pavilion; the other, at Modikhana Hospital, began in a cook-hut far from the hospital, to which owing to the very high wind the fire was conveyed across the European Plague Huts and stacks of hay.

The camps provided by the Committee have been of four kinds—Detention Camps, Contact Camps, Health Camps, and Private Camps.

In many instances however the same camps have served several purposes either at different times, or even at one and the same time.

Hospitals have been converted into camps and *vice versa*, according to the necessities of the moment and of the neighbourhood.

Detention camps are, properly speaking, those in which arrivals from outside are detained under observation and surveillance. They are sometimes called segregation camps, a term which is more properly applicable to Contacts.

Narielwadi Camp.

The Narielwadi Hospital, the Wari Bunder Hospitals for some time, and the Modikhana Camp were those which served as detention camps.

In August 1897, when at the close of the stormy season large numbers of Hindu traders and others came from the badly infected port of Mandvi in Cutch to Bombay, which was practically free from Plague, it became necessary to make arrangements for detaining arrivals either under observation or under surveillance. The hospital at Narielwadi was therefore enlarged and turned into a detention camp capable of accommodating 1,300 inmates.

The camp was opened on September 7th, 1897, and continued to be used for the observation of persons arriving in Bombay until January 15th, 1898, when it was set apart for Evicts up to February 12th, after which date it was converted into an hospital. All classes of persons, irrespective of race and creed, were sent to this camp; the total number of admissions being 16,385, of whom 506 were Contacts and 585 Evicts. The remainder were arrivals, principally from the Kathiawar Ports, kept under observation. Forty cases of Plague were removed to hospital, and two deaths occurred in the camp—one from asthma and one from consumption. In addition to this 134 persons were put in Observation Wards, but discharged as they did not develop symptoms of Plague.

The maximum accommodation of the camp was 1,300, and the staff, which varied from time to time, consisted of a Resident Medical Officer with one or two Hospital Assistants, and from 2 to 7 Medical Students, 2 Nurses, 2 ayahs, 4 clerks, 10 ward-boys, with cooks, *dhobis*, *bhistis* and sweepers, as required. Attached to the camp was a steam steriliser worked by an Engineer with four coolies and supervised by the Camp Medical Officer. A Fire Brigade manual engine was kept in the camp with firemen always in attendance.

During September and early October the pressure was at times so excessive that, to make room for new-comers, the full period of detention of ten days had once or twice to be reduced to seven.

Even without this concession, no system of detention on so large a scale could have worked without the help of a modified form of the surveillance approved by the Venice Convention. Under this modified surveillance, after a detention of 24 hours, during which the bulk of infected cases declare themselves, and during which the clothes and other belongings of infected arrivals were disinfected by being spread in the sun or sterilised by steam, the inmates, after being photographed in groups, and under the guarantee of a leading member of their caste, were allowed to go to their homes on condition of appearing at the camp for inspection twice during the next ten days.

The bulk of the arrivals from Cutch were Bhatias, Banias, Lohanas, and other well-to-do Hindu traders of good caste. No ordinary arrangements could have met the requirements of their high standard of eating, and their exclusiveness, and in certain cases their extreme religious punctiliousness. The wealth and the business habits of their caste-fellows in Bombay came to the assistance of the Committee, and with the aid of Sheth Govandji among Bhatias, of Sheths Manikchand Kapurchand and Damji Lakhmichand among Shrawaks, of Sheths Karamsi Damji and Kesavji Nathu among Lohanas, and of Sheths Tribhowandas Mangaldas and Khanji Devji among Banias, satisfactory arrangements were made for the cooking and other special requirements of all high-class inmates. With few exceptions the guarantors were careful and trustworthy. The chief difficulty lay in the wealth of the inmates which, before arrangements were in order, led to occasional corruption of the subordinate staff of the camps, and the escape of inmates.

Modikhana Camp.

In November, in consequence of the seriously infected state of Surat on the B. B. C. I. Railway, and of Nasik, Poona, Sholapur and Satara on the G. I. P. Railway, arrangements were made to detain arrivals by rail. To lodge these arrivals, a large camp, capable of holding 2,500 inmates, was built at Modikhana, to which a portion of the sea passengers and the whole of the G. I. P. Railway arrivals were daily taken under guard from the bunders and railway stations. (Arrivals by the B. B. C. I. Railway were accommodated in Wari Bunder.) During December the pressure of railway arrivals continued severe, occasioning at times as many as 2,500 inmates at Modikhana. Towards the end of January, in consequence of the increase of Plague in Bombay, the number of arrivals by train slackened and on January 24, 1898, detention of arrivals by train ceased.

The camp as per plan No. 6 attached was constructed on the Mody Bay Reclamation, in a convenient situation contiguous to Carnac

Bunder and the Victoria Terminus. It was surrounded by a bamboo mat fence and divided into two parts, so that one part could be used independently of the other. Further, a part was set aside for low-caste people, and detached buildings were erected for members of certain special communities. The drainage arrangements were complete and consisted of convenient washing-places and of open drains which discharged into the harbour.

The camp was opened on the 21st of November 1897 ; it was capable of holding 2,500 people. From the date of its opening until the 15th of April 1898, when it was closed, it served four purposes. The camp was first intended for the detention of passengers arriving in Bombay by sea or rail from infected areas. When Bombay became a badly infected area, the camp was also used as an Observation Camp, and people who wished to leave Bombay were required to remain in it for a period of from seven to ten days under medical observation, after which they were given a certificate of good health and allowed to go. It was first used for this purpose on the 16th of January 1898 and continued until the 6th of April.

From the 21st of November 1897 till the 15th of April 1898 the number of inward and outward steamer passengers who passed through the camp was 12,678, and the number of railway passengers was 9,717. The bulk of the inmates consisted of labouring Marathas from the South Konkan and Deccan. These people during their enforced stay were fed in the camp at the cost of the Plague Funds.

From the 11th of December 1897 till the 5th of March 1898 a portion of the camp was used for Contacts from A Ward. The number of Contacts who passed through the camp was 328. From the 14th of February 1898 till the 4th of March a portion of the camp was utilised for Evicts from infected houses in A Ward, there being no other camps then ready to receive them. The number of Evicts who passed through the camp during this time was 1,285. They were required to stay in the camp until their houses had been disinfected and rendered fit for habitation. Tickets were given to Evicts which allowed them to go out of the camp during the day for their work, returning in the evening. Cooking-places were supplied in the camp for all castes. There was a Bania shop at which all necessaries could be obtained.

The number of people of every description who passed through the camp was 24,330.

The staff of the camp in the month of January, when it was at its fullest, was: 1 Resident Medical Officer and 8 assistants, 12 clerks, 5 nurses, 2 office peons, 5 ayahs, 20 ward-boys, 2 ambulance-bearers, 2 lampmen, 2 *bhistis*, 1 *dhobie*, 6 cooks, 2 military pensioners, 17 limewashers, 21 sweepers.

The number of Plague cases which occurred in the camp during its occupation was 64. Of these, 1 case occurred among inward steamer passengers, 52 cases among outward steamer passengers, and 5 among railway passengers. Two cases occurred among Evicts, and 4 cases occurred among Contacts.

A steam disinfector was erected at the south-west corner of the camp in February 1898. Efficient fire arrangements were kept up in the camp, but they were only once called into requisition, and on that occasion a large *mandap* and a ward were burned down; set on fire, it is believed, purposely by an inmate of the camp.

Wari Bunder Camp.

This camp was originally the Wari Bunder Hospital. In September 1897, to prevent danger from infected arrivals through the ports of the South Konkan, the two neighbouring hospitals at Wari Bunder, of which one had been handed over to the Committee by the Port Trust, were turned into one camp with room for 1,300 inmates.

These inmates were of two classes: (1) Inward sea passengers arriving in Bombay from ports within affected areas in Colaba and Ratnagiri, and (2) Passengers leaving Bombay who were detained at the outward harbour inspection. This arrangement continued until about the 20th November, after which the seven days' detention was applied to passengers coming into Bombay by rail, and the Wari Bunder Camp, the capacity of which had been extended to nearly 2,000, admitted most of these in addition to the sea passengers. But as the number of inmates rapidly increased the construction of the Modikhana Camp was started, and that camp was completed by the middle of December. The Wari Bunder Camp then admitted the majority of the sea passengers, together with those of the railway passengers who arrived in Bombay by the B. B. & C. I. Railway. By the middle of January, in consequence of the great increase of Plague, it was considered advisable to reserve the Wari Bunder Camp entirely for Contacts, the Modikhana and Narielwadi Camps having sufficient accommodation for passengers.

The Wari Bunder Camp worked well; there was little wish to leave, and hardly any attempts were made to corrupt the staff. It is true that no large number of Plague cases developed in the camp. At the

same time, on arrival the bulk of the inmates were in a reduced state, the result of famine or high-priced grain. The rest, the good food, and the healthy condition of life in the camp were of great value to inmates of this class before passing to the hard work and unwholesome surroundings of a Bombay labourer.

The total number of steamer passengers, outward as well as inward, who were passed through the Wari Bunder Camp from its opening until it was turned into a Contact Camp, was 23,542, giving a daily average admission of about 175. The number of railway passengers who were passed through the camp during the months of November, December and January was 4,096, mostly from the B. B. & C. I. Railway. Thus, the total number passed through the camp, while it was a Detention Camp for passengers, may be placed at a little over 27,600. The capacity of the camp was 2,000, the average number of inmates was over a thousand, and the maximum 2,100.

On admission each passenger was registered and supplied with a note bearing his register number and date of admission. They were then detailed to different wards (males and females separately), as far as possible according to their different caste or community. High temperature cases were kept in Observation Wards, apart. The number of inmates in camp was counted every morning and evening, when they were also medically examined, and any suspicious cases were removed to the Observation Ward.

Sleeping mats were given to all on admission, and to those requiring them, blankets for use while in camp. As far as possible, respectable families were accorded separate rooms, being allowed to live together, and to use any available cots.

Most of the inmates of the camp received free rations according to the following scale :—

Per head per day.

Rice.	Wheat.	Flour.	Ghee.	Dhall.	Vegetable.
1 lb.	½lb.	...	2 oz.	4 oz.	6 oz.

and besides this, salt, condiment, tea, sugar, and milk for babies; the flesh-eating people also received mutton every other day. They received either dry rations or cooked food, according to their choice. Some of the passengers made their own arrangements for food.

After the fair season had set in, all the clothes of passengers were disinfected by careful exposure to the sun from four to six hours. In addition to this, all woollen and dirty clothes and bedding were

disinfected by immersion for an hour in a tank filled with perchloride solution of 1 in 1000. The tickets of persons whose property was thus disinfected were marked. All the inmates were disinfected on admittance, and again before discharge, and they were not allowed to leave the camp unless their tickets showed they had been disinfected.

All inward passengers arriving at the camp were detained for a period of seven days except, which rarely happened, when the pressure of new-comers on the available space made it necessary to discharge inmates in good health who had undergone five or six days' detention. Outward passengers sent for observation were detained till they had been free from any rise of temperature for 48 hours, and were then discharged.

Passengers, if free from any rise of temperature or other suspicious signs, were allowed, after they had remained 24 hours in camp, to leave with surveillance tickets, on the surety of one of the leaders of their communities. The total number of persons discharged on surveillance was about 2,500, most of whom reported themselves for inspection regularly on the appointed days. Only some 20 defaulters failed to report themselves, and the surety of those persons who had stood responsible for these was not again accepted.

People going out on a surveillance pass were photographed before discharge, and, at the time of inspection, they were compared with their photographs. The inspections, which were usually two or three in number, were fixed on alternate days. Only one case of Plague is known to have developed amongst those discharged on surveillance—a Kapol Bania from Baroda, who showed suspicious signs of Plague on his last inspection-day. He was detained in camp and subsequently transferred to a Plague Hospital, where the case was diagnosed as one of Plague.

From October to 15th January 120 cases were transferred to Plague and other Hospitals. Out of these, about 90 showed symptoms which were suspicious of Plague; the rest were diagnosed as other diseases and transferred to General Hospitals for treatment.

Contacts came mostly in families or groups of families, each with all its removable luggage and furniture. As cases of Plague constantly occurred amongst them, it was thought necessary to segregate each individual family as far as possible; and with this object the camp was refitted to meet the requirements of this arrangement. Each of the general wards was divided by matting partitions into rows of small com-

partments, with a central passage down the centre of the ward. Each compartment would accommodate eight to ten persons. A part of the camp was railed off and reserved for the accommodation of suspicious cases, including Temperature Cases and Re-contacts. This part of the camp was called the Observation Ward, and its inmates, besides being kept under closer observation, were not allowed to mix with the others.

In January 1898 the Wari Bunder Camp was set apart for Contacts and under the management of Surgeon Knapp, R. N., very careful arrangements were made for the bathing and the steam sterilising of the clothes of all inmates before their admission into the camp, and also for the segregation and treatment of the immediate companions of any inmate who sickened after admission. The securing of the proper number of Contacts has been a difficulty which the Committee has failed to overcome. The greatest number of Contacts in the Wari Bunder Camp was 1,061, March 10. During March, when it was found advisable to relax certain of the Committee's measures, and when the decline of the epidemic seemed to permit of concessions, the law regarding Contacts ceased to a great extent to be enforced. By the end of March the total inmates of Wari Bunder had fallen to 157, and by the middle of April to 103.

After the camp was made a Contact Camp, a more convenient and thorough method of disinfection was felt to be necessary, and an Equifex Disinfecting Stove was put up in front of the camp, on a piece of ground kindly lent by the G. I. P. Railway Authorities. The Contacts, as soon as they arrived, were taken to the disinfection yard and disinfected with all their kit before they were admitted into the Camp Proper. They were then medically examined—males by Medical Students and females by a Nurse—and their temperatures noted on their tickets. After medical examination they were taken to the bath-rooms and there told to bathe first in clean water and afterwards in Phenyle Solution, a ward-boy and an ayah being on duty to help them. They were then supplied with camp clothes and taken to the other side of the yard, where they waited till they received their own disinfected apparel.

In the meanwhile all their kit was collected and put loosely into gunny bags which were numbered, similar numbers being given to the owners, and the gunny bags placed in the disinfector and sterilised. All articles of furniture were disinfected with Perchloride Lotion and then exposed to the sun. The Contacts, thus disinfected, had their tickets stamped "Disinfected," and were taken over to the camp. Temperature and suspicious cases were placed in the Observation Ward, and those

found suffering from ailments other than Plague were kept in Hospital Wards till the period of segregation was over.

Cooked food and dry rations were kept ready for new Contacts, and in one or other form, they got their food soon after coming to the camp. Well-to-do persons paid for their food, which they bought from the contractor's shop in camp. Children under two years of age were given milk. Cooking-pots were also lent to those needing them. Lastly, high caste Banias and others who would not under any circumstances take their food in camp, were allowed to go out to take their food, returning to the camp in the evening.

As many of the male and some of the female Contacts were daily workers, they were furnished with passes to enable them to go out for work and return to the camp in the evening. Most of these people had their families with them, whom they left in camp, this being considered a sufficient security for their return. A few others left their kit in the camp.

Well-to-do persons without families in camp deposited Rs. 50 per head as security, or some article of corresponding value, before leaving the camp. Persons producing security from a Justice of the Peace or a leading citizen, or servants producing letters of security from their masters, were allowed passes. These pass-holders, as a rule, returned to the camp regularly and faithfully, and only in a very few instances failed to do so.

As Plague cases frequently occurred amongst Contacts, it was necessary to have four medical inspections in the 24 hours. They were twice carefully examined and their temperatures taken morning and evening at 7 a.m. and 4 p.m. respectively, the two remaining inspections being made at 2 p.m. and 8 p.m. If a case was only slightly suspicious, it was simply removed to the Observation Ward. Other cases were at once sent to a Plague Hospital.

After the transfer of any Plague or suspicious case to hospital, the following procedure was adopted. All the occupants of that room or compartment were removed with their things to the disinfection yard to be disinfected a second time, and then placed in the Observation Ward as Re-contacts; they there had to undergo another period of seven days' detention from the date of their being made Re-contacts. The mats in the room in which the case had occurred were burned in an incinerator. The room itself was thoroughly disinfected with H.P. lotion, 1 in 1000 strong, and exposed to light and air. After 24 hours it was limewashed and closed for use for a period of seven days. The period

of detention for Contacts was seven days. On the eighth day, if free from suspicious signs of Plague, they were discharged. Certificates of detention in camp were given to those who asked for them.

During January 1,104 Contacts were admitted into the camp for segregation and observation, giving a daily average admission of 35·6. During the month 42 cases were transferred to Plague and General Hospitals. Out of these, 29 turned out to be Plague, 9 relapsing fever, and the rest other diseases. Thus, out of the 1,104 Contacts admitted, 29 or nearly 2·5 per cent. developed Plague.

During February 2,731 Contacts were admitted into the camp for segregation, giving a daily average admission of 97·5, thus showing a large increase over the number for January.

During the month 83 cases were transferred to Plague and General Hospitals. Out of these, 47 turned out to be Plague, 9 relapsing fever, 6 chicken-pox, and the rest other diseases. Thus, out of the 2,731 Contacts admitted, 50 or 1·8 per cent. (including 3 under observation) developed Plague.

During the month of March 1,528 Contacts were admitted into the camp, giving 49·2 as the daily average. During this month 80 cases were transferred to hospital, out of which 55 turned out to be Plague, and only 1 relapsing fever. Thus 3·6 per cent. of admissions developed Plague. Most of these cases—fully two-thirds—developed symptoms within the 48 hours after removal to the camp, and the number of cases developing Plague was inversely proportional to the number of the days passed in camp.

The following table shows this more clearly.

During the three months January, February and March, 131 cases in all developed Plague. Out of these—

39	cases	developed	symptoms	on the	day of admission.
30	„	„	„	first	day after admission.
19	„	„	„	second	„ „
13	„	„	„	third	„ „
11	„	„	„	fourth	„ „
9	„	„	„	fifth	„ „
6	„	„	„	sixth	„ „
R. C. 1	case	„	„	seventh	„ „
R. C. 1	„	„	„	ninth	„ „
R. C. 2	cases	„	„	twelfth	„ „
131					

Beyond the sixth day no case occurred from amongst the Contacts ; the three cases marked " R.C. " are from among " Re-Contacts."

From these figures the following inference may be drawn regarding the incubation period of Plague :— **Incubation.**

That detention for seven days under observation would be a sufficient precaution.

From the starting of the camp no case of Plague occurred which seemed to have its origin in the camp itself. This inference is supported by the complete immunity enjoyed by the entire staff of the camp, numbering 60 or more, and residing within the camp premises.

The staff of the camp consisted of—

1. The Chief Medical Officer—a qualified medical man who was always a Commissioned Officer of the Army or Navy ;
2. The Resident Medical Officer, also a qualified medical man ;
3. The Sub-Medical Officer, a non-qualified man of some experience in Plague work ;
4. A Staff of three Nurses, one of them acting as Head Nurse ;
5. A varying number of Medical Students ;
6. A varying number of clerks ;
7. A staff of orderlies, ward-boys and menial servants.

Three Municipal Fire Brigade men were on duty in the camp night and day, in charge of a hose reel in case of fire occurring.

Health Camps are both Public and Private. During January, February and March the need for vacating infected houses and the necessity for providing an outlet for those who were anxious to leave infected sections of the city, but were prevented by the necessities of their calling and position and by the difficulty and delay of passing out of Bombay, led to the formation of Health Camps on the Port Trust property, on the Esplanade, on the Kennedy Sea-face, at Kamathipura, at Byculla, and Dadar. The relaxing of the search and vacating rules in March reduced the numbers of inmates in these camps. Still, **Health Camps.**

except the Dadar Camps, the bulk of them have continued popular and more or less completely occupied till the end of April.

In other respects the results of these Health Camps are satisfactory. The health has been good, the inmates have been contented and have left with regret. The low sites on which the Dadar, Byculla and part of the Foras Road (Balaram) Camps have been built, and the fair-weather flat-roofed structures on part of the Kennedy Sea-face, will necessitate the removal of those camps before the close of May. But the materials set at liberty will be usefully employed in strengthening against the rains the portions of the Balaram and Sea-face and the Narielwadi and Esplanade Camps which should, if necessary, even during the rains provide accommodation for 1,000 inmates.

One object of Health Camps is to provide accommodation which may be found useful when the Improvement Trust begins to clear evil houses and to open streets and spaces. In Paris and in London the early operations of similar City Improvers caused serious distress, because those in charge failed to provide lodgings for the unhoused. The Plague Committee were satisfied that in Bombay, if no steps were taken to guard against it, the evil of excessive clearing of houses was likely to prove specially serious. Rents would rise and the unwholesome houses of the labouring classes would be more crowded than ever. To relieve this pressure, care has been taken, when possible, to build camps on sites raised and sheltered enough to give the huts, with necessary strengthening, a fair chance of lasting during the rains.

Even in the case of low-lying sites where huts were not likely to survive the rains, it was hoped that the result of transplanting people from the crowded slums of Bombay to open land in the north of the Island might encourage a permanent movement from the overcrowded city to the open north. The temporary gain was evident. Abundant and comfortable camp accommodation was the only chance of staying the panic flight which marked severe local outbreaks during the recent, as well as during the original, epidemic. Five or six seizures; two or three deaths in a chawl or in an enclosure, and in a few hours the residents disappear, not uncommonly leaving behind them a share of their goods and chattels. Free carriage of their goods to free quarters reconciled most families to eviction. They went readily and settled quietly, lived happily, gained health and strength, and left, if they had to leave, with regret.

One of the lessons taught by the building of the Dadar Camp is the extreme difficulty of arranging with inmates of the working classes

to travel daily to the city, even though their railway fare is paid. At first the chance that the difficulties would be overcome seemed hopeful. Later the difficulties were increased—

(*a*) By the sense of insecurity caused by the riot of March 9th.

(*b*) By the lessening of the fear of Plague when, about the middle of March, the epidemic began to decline.

The very little use that has been made of the Dadar Camp is one of the chief failures in the Committee's programme.

One main object of the Bombay Health Camps was to pass through the camps the greatest possible number of the poorer classes who live in insanitary houses. Fourteen clear days is laid down as the minimum of effective detention. In practice, it has been found difficult to get rid of inmates even after an interval of fourteen days.

The inmates of Health Camps who have fulfilled fourteen clear days may be grouped in three classes:—

(*a*) Those who wish to leave Bombay.

(*b*) Those who wish to return to their former houses.

(*c*) Those who wish to go to new lodgings.

A fourth class may be added:—

(*d*) Those who are willing to stay in the camp or, if necessary, to move into another Health Camp.

As to (*a*);—unless since their arrival a case of Plague has occurred in their hut, all inmates who wish to leave Bombay should be provided with a certificate of health, of fourteen days' residence in a Health Camp, and of freedom from any sign of Plague. As a rule, no application for such a certificate should be refused, and every facility should be given for the immediate grant of the necessary pass to any individual or family anxious to leave.

As to (*b*);—that is, inmates who have been in camp fourteen clear days and wish to go to their former quarters, the Camp Master should ascertain whether the house to which the applicant for discharge belongs has been duly disinfected and passed as fit for use. If the house has been passed as fit for use, the inmates should be discharged as soon as possible after the fourteen days have been fulfilled.

NOTE.—The value of a Health Camp and the credit of a Camp Master depend on the number of inmates he can pass through his camp disinfected and free from the chance of fresh infection by the occurrence of any case of Plague in the camp. It follows that, while the inmate is undergoing the fourteen days' detention, the Camp Master should ascertain and arrange with his superior officer that steps be taken to secure that the inmate's lodging is ready to receive him at the end of the fourteen days.

The case of (*c*);—that is, of persons under detention who do not wish to return to their former lodgings, is more difficult. In theory it is desirable (1) that such persons should during their period of detention look for some new lodgings and inform the Camp Master; (2) that the Camp Master should forward the address given to the District Plague Officer to ascertain if the proposed dwelling is fit for use. In practice, it seems unlikely that such arrangement will work. The procedure will prove difficult and burdensome, and it will fail to secure that the inmate does not within one or two days move from the approved house where he pleases. It therefore seems best to allow inmates to choose their lodging and to confine operations to securing that, so far as possible, few insanitary and no infected houses may be open for casual occupation.

The fourth class of inmates are those who prefer camp to hired lodgings.

In city camps it is not advisable, except in special circumstances, to allow inmates to remain in camp for more than fourteen days. In the case of inmates who prefer camp-life, or in the case of inmates whose houses are not ready for use at the end of fourteen days, or whose houses may have been condemned as unfit, arrangements should be made to remove them from the original city camp to the main camp at Dadar. Such inmates should be taken to Dadar free of charge and be handed to the Camp Master, who will assign them quarters. They, or at least the bread-winners of each family, should be provided with a railway ticket for a daily journey to work and accommodation in Bombay. Such families will be allowed to stay in the Dadar Camp so long as they choose, unless their quarters at Dadar are urgently wanted, in which case arrangements will be made for conveying them to some other camp or to a lodging. It is to be understood that though, as a rule, those who prefer it may remain permanently in the Dadar Camp, any inmates who wish must be allowed to leave the Dadar Camp at the end of fourteen ordinary days' detention.

As a rule, families told off for the Dadar Camps will be taken out of Ward Health Camps. Such families will reach the Dadar Camp with bedding and clothing disinfected by steam. When families are moved from their dwellings direct to the Dadar Camps, they should be stopped either at the Agripada or the Wari Bunder Camp and have their heavy kit, bedding, quilts and padded clothing sterilised.

Byculla Camp. The Health Camp known as the Byculla Camp, situated on the north side of the Morland Road in Byculla, was one of the principal

camps. As it was not then known to what extent eviction would be carried, orders were at first given for only sixty huts, each containing two rooms (20′ × 20′).

In the middle of January, when the vacating of infected houses was commenced on a large scale, the Committee gave orders for the camp to be extended, as quickly as possible, to accommodate about 7,000 people, with corresponding latrine accommodation at the rate of 50 persons for each latrine seat. The masonry washing-places constructed by the Muncipality soon proved insufficient for the increasing number of people; three large corrugated iron washing-places, each containing 40 taps, were therefore constructed as quickly as possible.

For the purpose of collecting household slops and remnants of food, which would otherwise have been thrown in front of the huts, a bucket was placed opposite each door and a small iron tank-cart drawn by one bullock made a round of the camp twice a day or oftener if the Camp Master thought necessary. Into this tank-cart the buckets were poured by the camp sweepers, and the contents of the carts were emptied into the drain which runs through the middle of the camp.

For prevention against fire two fire-stations were erected and four men were placed on duty in each under the Chief of the Fire Brigade. At each fire-station was kept a hose reel containing 200 yards of hose and six grappling irons. Water was always obtainable from the main on the Morland Road adjoining the camp. The grappling irons were for the purpose of pulling down a line of huts immediately in the course of the fire. To prevent the risk of fire breaking out in cooking-places, a triangular sheet of iron, 2′-6″ high, was placed in the corner of each hut behind the hearth, the iron plate was placed about six inches from the side of the hut, and the space behind was filled with earth.

On the arrival of Evicts in camp, a room was assigned to each family. But if the family consisted of more than eight persons, two rooms were allowed. The names of the occupants of each room and the district from which they had been sent were registered in the camp office. In February 1898, house-vacation was being carried on so vigorously that other Health Camps were soon filled, and people from all parts of the city were sent to the Byculla Camp. The average daily number received in camp was from 50 to 200; on the 22nd of February 544 were received, and on the 19th of March 1,056.

As was to be expected from receiving so many people from the worst infected parts of the city, cases of Plague commenced to occur among the occupants of the camp.

A Resident Medical Officer was then appointed to the camp; but, as the work of morning and evening inspections was found far beyond the power of one man, four Hospital Students were sent to assist him. From the commencement of the occupation of the camp until the middle of April there were 70 cases of Plague in the camp. Out of these, 61 cases occurred within five or six days of admittance into camp and 9 occurred after ten days' residence.

As there was no steam disinfector in the camp, the belongings of all persons coming into camp were exposed to the sun daily.

When a case of Plague was detected in the camp, it was immediately sent to a Plague Hospital, and the hut in which the case was found, the huts on either side, and the room behind, were all vacated, the roofing was taken off, and the infected room was disinfected with Perchloride of Mercury. The Contacts were sent to the Wari Bunder Camp. The bedding of the sick person and any rubbish found in the room were burned.

As the number of people in camp increased the staff had to be supplemented until at the beginning of March, when the camp was almost full, it consisted of 1 Camp Master, 1 Doctor and 4 assistants, 3 clerks, 2 peons, 2 disinfecting coolies, 2 ambulance-bearers, 40 sweepers, and 40 *halalkors*. The lighting of the camp was done by the Municipality.

The total number of people who passed through the Byculla Camp was 14,400, and the greatest number in the camp at one time was 5,140 on the 1st of March.

At the beginning of March, when the camps at Dadar were ready for occupation, it was proposed to move out all people from the Byculla Camp whose houses in the town were either unfit for human habitation, or could not be suitably repaired for a considerable length of time, and make way for people who would only be obliged to remain the necessary fourteen days in camp. A steam steriliser was put up in the camp, and all people who, under the above circumstances, were to be sent out to Dadar, either from the Byculla Camp or any part of the town, were to have their belongings first disinfected here. This procedure

was prevented by the issue of orders restricting the compulsory vacation of houses.

Dadar Camps.

These two camps were constructed in accordance with instructions given by Government at an informal meeting of the Committee called by His Excellency the Governor at Government House on February 8th, 1898.

It was then proposed to build accommodation for 20,000 persons. This proposal however was not entirely carried out, two camps only being built, each with accommodation for 4,900 persons. The first of the camps was opened on March 5th, when 150 people were admitted from Girgaum Road. It had been arranged to transfer from 2,000 to 4,000 persons from the Byculla Camp to the Dadar Camps, owing to the houses from which they had been removed either not being ready for re-occupation or having been condemned as unfit for human habitation; but, in consequence of the issue of new orders in regard to Plague operations, this plan could not be carried out.

The total number of people admitted into the Dadar Camp was 1,017, and these mostly left after remaining the requisite fifteen days, the objection being in most cases taken that the situation of the camp was inconvenient for their work. During their residence the inmates appeared contented, and their health was remarkably good, the only sickness being two cases of Plague, which developed, one seven days, and one eight days, after admission into camp.

To *bonâ fide* labourers free railway tickets were given to and from their work, provided they brought certificates from their employers to the effect that they were in regular employ. Huts for better-class families were erected within the precincts of the camp with four rooms to each, for which a rent of Rs. 10 a month was charged. The following agreement was signed by persons occupying these :—

NOTICE

To Occupants of Better-class Huts in Dadar Camp.

1. The rental of each hut has been fixed at Rs. 10 per month, which must be paid in advance.

2. Those wishing for huts must understand clearly that they must be content with all arrangements as they find them. No structural or other alterations of huts, hearths (*chulas*), lavatories or latrines will be

permitted under any circumstances, and the occupants must conform to all rules which may be framed for the whole camp. *Chulas* are now being built in huts.

3. A daily medical inspection of all occupants will be insisted on and must be submitted to.

4. Each hut will consist of four rooms, and not more than one hut can be assigned to one family.

5. The Camp Superintendent reserves the right of dismissing any one from the camp who may be in any way objectionable, without refund of any moneys received.

6. Before any hut is assigned, the head of the family is required to sign this paper to the effect that he is willing to submit to these rules.

7. Before permission to reside in the camp is given, a certificate must be produced from the District Medical Officer to the effect that there has been no recent case of Plague in the family.

Superintendent, Dadar Camp.

Date, 1898.

Chulas (hearths) were in most instances provided outside the rows of huts, and for greater safety against fire they were built with shelter from the sun and wind. Where this was not possible, a small brick wall was constructed in the angle of the hut and six inches from the side.

A 3" water pipe was laid through the camp, on which was fixed a number of hydrants, and a staff of three Municipal Fire Brigade men were always on duty in charge of a hose reel. The latrine and washing accommodation was on the same scale as in the Byculla Camp.

A Military Guard of 1 havildar and 15 sepoys, 8th Bombay Infantry, was placed in charge of each camp.

The following staff was proposed for the camps when full :—

1 Camp Master. 1 Doctor. 1 Compounder. 4 Clerks. 1 Lampman. 1 Office-boy. 4 Inspectors. 3 Peons. 51 *Bigaris* and *Halalkors*.

Byculla Bridge Camp.

This camp was for low-caste people only. It was erected in October 1897, though half of it was not used till February 1898. There is accommodation for 230 people, and 400 have been admitted altogether. There have been 9 deaths up to date: 4 from Plague, and

5 from other causes. Nine cases have been removed to hospital, of whom 4 had Plague and 5 relapsing fever. There are two watchmen in charge, but no other special establishment.

Narielwadi Health Camp.

This camp, built on the Port Trust land adjoining the Reay Road, was constructed in February last and was ready for occupation on March the 1st. It was actually occupied on March the 6th. The camp can hold 750 people comfortably, and is at present practically full. The total number of admissions has been 924. Six cases of Plague have been removed to hospital from it, and two deaths, due to causes other than Plague, have occurred in the camp. Up to date there have been no births. The staff consists of a Camp Master, four watchmen, and eight sweepers. Water has been laid on, and latrine accommodation provided.

Kennedy Sea-face Camp.

This camp was opened on the 20th of March 1898 and provides accommodation for 3,000 persons. It was intended for people removed from infected houses in Dhobi Talao, Phanaswadi, Girgaum and Chaupati. Special arrangements were made for high and low caste persons, the camp being divided by a fence for this purpose. Up to the end of March 964 persons were in occupation, of whom 5 developed Plague within seven days of their admission into the camp, and were removed to hospital. Besides the above-mentioned accommodation, a series of superior huts were provided for Government and Municipal clerks at a rent of Rs. 20. This amount was reduced as the time before the commencement of the rains became shorter.

Gokuldas Tejpal Camp.

This camp was built to accommodate persons sent from infected houses in the Market District. It was opened on the 7th March 1898. The huttage accommodation was for 1,500 people. During the month of March it contained its full complement. Twelve persons developed Plague in the camp, and three died before they could be removed to hospital. A small detachment of the Durham Light Infantry resided in the camp and served the double purpose of Guard and Camp Inspectors. They also superintended the disinfecting of the persons and belongings of arrivals in camp at the beginning of March, until it was found impossible to disinfect on such a large scale without a steam disinfector. This camp was very popular with the people, who, when once there, preferred to stay rather than return to their houses. It was situated very conveniently for the bazaar and for their work. Excellent fire arrangements were made, and the presence of several wells in the camp considerably facilitated matters.

Elphinstone Camp.

This camp is situated on the north portion of the Maidan, known as the General Parade Ground. It was intended for people from infected houses in the Esplanade and Fort Districts. Cases of Plague having occurred among the men of the 21st Bombay Infantry, the Military Authorities obtained permission from the Committee to turn the regiment out of their lines into this camp. It was occupied on the 6th of April 1898. There is hutting accommodation for 1,500 people, with proportionate latrine and water arrangements. No case of Plague has occurred among the occupants of the camp. The staff of the 21st Bombay Infantry have been responsible for the cleanliness of the camp.

Cruickshank Camp.

This camp is situated on the south-east portion of the Brigade Parade Ground on the side of Cruickshank Road, from which it derives its name. It was intended for people from infected houses in the Esplanade and Fort Districts. The camp is capable of holding from 750 to 800 persons. It was opened on 28th March 1898. The number of people in camp on the 15th of April was 192. No case of Plague has occurred among the occupants of the camp. The staff of the camp in the month of April was 1 Camp Master, 4 watchmen, 5 sweepers, 4 *halalkors* and 1 lampman.

Elphinstone Bridge Camp.

This camp was built to accommodate persons removed from infected houses in Nowroji Hill, and was opened on January the 20th, 1898. The total huttage accommodation was for 500 people. In all 783 persons passed through the camp. Three cases of Plague occurred, all within seven days of occupation, and from the same house.

Ellapa Ballaram's Camp.

This camp, situated in Foras Road, Tardeo, is purely a Health Camp, and has been established by the munificence of Rao Saheb Ellapa Ballaram, the enlightened head of the Kamathis. Though intended for Kamathis, it was generously thrown open for the use also of Marathas evicted from Kamathipura. It was opened on December 12th, 1897, with 158 huts, estimated to hold 790 people, to which were added during March 189 more huts, raising the possible total of inmates to 1,735. The total number of admissions has been 1,447, amongst whom there have been 2 births and 12 deaths, while 17 cases of sickness, 16 of which were Plague, have been removed to hospital. One curious case may be quoted. The camp staff consists of a Camp Master, 4 watchmen, 1 lampman, 6 coolies and 5 scavengers.

The water and latrine arrangements are complete, and the camp is kept in excellent order. A fire hose reel, in charge of men belonging to the Fire Brigade, is kept at the gateway.

Maratha Camp.

The Maratha Camp, in Connaught Road, together with the hospital to which it is attached, was built by subscriptions amongst the Maratha community and the millowners who employ large numbers of Marathas, both Konkanis or Ghatis, that is West Dekhanis. Its use is confined to Marathas. It was opened on January 1st, 1898. There is accommodation in the Health Camp for 800 people, and 921 have been admitted up to April 10th. Since that date the camp has been filled owing to the vacation of a number of houses, and the total number of admissions is now just over 1,200, the camp being almost full.

Thirty-six cases of sickness have been removed from the camp to the hospital, of which 19 were Plague, 14 simple fever, 2 chicken-pox and 1 consumption. No death has occurred in the camp. There was one birth on February 24th.

The camp is in charge of a Camp Master who, with a clerk and a staff of limewashers and sweepers, keeps it in excellent order, so that it has been in every way a success. In addition to the Health Camp there is accommodation for 200 Contacts within the hospital fence: 639 persons have been admitted as Contacts, amongst whom 12 cases of Plague and 1 death occurred. There were also 3 cases of simple fever, one of which has been discharged, while 2 are still under observation.

Private Camps.

From the middle of December 1897 numbers of Parsis and superior and middle-class Hindus began to leave the infected parts of the city and move to the open country to the north of Bombay or to suburbs in the adjoining Salsette Taluka of the Thana District. As the cold weather began to decrease in intensity, this exodus became more general, and by the end of March 1898 about 45,000 people had left Bombay and were encamped either in the north of the Island or in the suburbs. Restrictions had necessarily to be placed upon going into the districts, but passes were freely granted to respectable and responsible persons.

In the statement below is given the approximate number of people who removed beyond the limits of Bombay Island:—

G. I. P. Railway.		B. B. C. I. Railway.	
Kalyan	about 200	Bassein	about 250
Demauli	„ 100	Bhaynder	„ 50
Diva	„ 250	Borivli	„ 500
Mumbra	„ 150	Malad-Goregaon ...	„ 2,000
Thana	„ 500	Andheri	„ 2,000
Nowpada	„ 500	Virlapal and Amlauli ...	„ 2,000
Bhandup	„ 1,000	Santa Cruz	„ 1,000
Ghatkuper	„ 3,000	Bandra	„ 1,000
Kurla	„ 2,000		
Chimbur and Manigaum ...	„ 1,500		8,800
	9,200		

As there was Plague in Kalyan Town when the exodus from Bombay began, only new chawls and bungalows near the station were occupied by Bombay people. In all other towns and villages every available bungalow, house or chawl, and in many cases out-houses and even cow-sheds were occupied by people from Bombay who paid high rents. Temporary huts were built in large numbers at Bhandup, Ghatkuper, Kurla and Chimbur, and in small numbers at Demauli, Diva and Mumbra. The Gujarati element predominated in Ghatkuper and Chimbur, and the Marathi-speaking population in Thana, Bhandup and Kurla.

In Chimbur, Thana and other places Bombay people went to live with their relatives. Permission was given to Government servants to occupy the buildings at Nowpada intended for the Lunatic Asylum. The conditions were that the cook-rooms were to be built at the expense of the occupier. Many Government servants availed themselves of the opportunity.

Large numbers of huts were built between Malad and Goregaon, and some in Santa Cruz. Many people went to live at Bandora and adjacent villages in spite of restrictions. Rich Bhatias and other merchants lived in Vesawa and Amlauli. Except in municipal towns, such as Bandora, Bassein, Kalyan, Thana and Kurla, sanitary arrangements were made by the people themselves. At some places these arrangements were very imperfect.

Towards the beginning of April, Plague made its appearance in Thana, Bandora, and Andheri, and, as some districts of the Bombay City were tolerably free, many people returned to Bombay.

Very little of the vacant ground offered by the Collector of Thana in Kalyan and Salsette Talukas was taken up, probably because private ground was available everywhere. As stated above, many people also moved to the outlying parts of the City, such as Sewri, Parel, Dadar, Mahim, Matunga, Sion and Worli. Almost every bungalow and house was rented by the end of December. In the beginning of January 1898, as the Plague showed no tendency to decrease and the low land in the neighbourhood of Dadar and Matunga had dried, people built huts or pitched tents in the fields or open *oarts* and moved into them. The Parsi Panchayet built a series of sheds adjoining the Vincent Road in Matunga for their caste people. The *Times of India* Office repaired their sheds, on the same road, built last year for the accommodation of their employés. In and

round Matunga some temporary camps in an organized form were constructed. Generally, when a camp was built and occupied, clusters of huts sprang up round it and were immediately occupied, thus showing that, if an initiative in this direction were at once taken, the example would be sure to be followed. The Plague Committee encouraged such spontaneous vacating.

Water-connections were given to these camps or groups of huts as necessity arose. *Halalkor* service was provided. Sweepers, and in some cases watchmen, were also given, and general sanitary supervision over all the camps was provided.

The following is an approximate estimate of the numbers who went to live in these parts either in permanent or temporary buildings :—

Sion and Dharavi	1,000
Matunga, Vadala, Bhoivada	1,500
On the east of the G. I. P. Railway beyond Parel (not including the Plague Committee's camps) ...	9,000
Between the two Railway Lines beyond Parel ...	8,000
Mahim Proper...	5,000
Dadar and Naigaum	2,000
Parel village, including—	
Golanji Hill	1,000
Sewri	1,000
Worli	250
Total...	28,750

Of Private Camps, the Parsi Panchayet, the *Times of India*, Mr. Kashinath Dhuru's, Mr. S. N. Lund's, Rao Saheb Vaidya's, and Mr. Vizbhukhandas Atmaram's Camps deserve special mention.

The Parsi Panchayet built and maintained a number of small camps for the use of their community. They accommodated altogether 324 families or, roughly, 2,500 people. The largest of these camps were :—

The Marine Lines Camp, which contained	50 huts.
The Chaupati Camp	43 huts.
The Delisle Road Camp	47 huts.
Matunga Camp	54 huts.

Three cases of Plague occurred in the Parsi Camps.

TABLE A.

Section Mortality Returns, March 1897—March 1898.

Recorded Plague Deaths.

Sections.	Months, 1897.																		Months, 1898.					
	March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		January.		February.		March.	
	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.	Attacks.	Deaths.
Upper Colaba ...	41	12	5	5	4	2	3	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	10	2
Middle and Lower Colaba.	10	15	26	18	19	11	4	3	2	2	10	3	3	2	19	3	23	10	44	10	51	20	61	32	35	27
Fort, South	14	0	7	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	2	0	2	14	1
Fort, North	39	19	19	6	7	1	4	0	3	0	0	0	0	0	0	0	4	3	31	6	285	89	440	34	162	31
Esplanade	3	6	4	0	2	1	0	0	1	0	1	0	1	0	5	0	0	0	0	0	0	4	0	9	3	3
Mandvi	43	32	137	41	47	6	16	3	5	1	17	7	53	12	53	7	54	7	90	19	114	39	143	49	137	67
Chakla	3	6	10	10	11	1	1	1	0	0	4	0	5	0	6	1	9	4	22	3	143	41	122	29	43	17
Umarkhadi	43	25	46	16	25	3	5	2	0	2	13	2	7	7	13	3	20	3	39	13	176	96	207	70	95	31
Dongri	43	28	47	26	20	7	11	3	4	0	7	0	24	3	11	2	31	7	44	16	160	62	186	57	78	97
Market	27	15	35	7	9	3	4	0	1	0	4	0	5	0	4	3	11	5	58	18	266	83	402	115	229	70
Dhobi Talao ...	31	30	22	14	6	3	3	3	1	1	1	2	7	5	7	1	6	2	18	12	124	77	301	157	198	147
Phanaswadi	16	4	16	2	2	0	3	2	0	0	1	1	3	1	7	2	1	1	9	2	32	30	245	73	157	52
Bhuleshwar... ...	24	11	23	3	11	5	7	3	2	1	2	0	3	1	3	0	6	1	52	9	196	77	239	61	105	36
Khara Talao ...	14	7	16	3	22	2	10	1	1	0	2	1	11	2	6	0	17	1	32	3	115	51	153	30	33	29
Kumbharwada ...	56	33	46	19	25	5	7	2	3	3	17	6	9	4	14	5	27	3	59	24	181	34	190	75	155	107
Khetwadi	22	13	9	6	15	2	10	3	1	1	1	0	5	1	5	0	10	3	22	6	39	46	170	64	208	124
Girgaum	23	17	7	4	3	2	1	1	0	0	1	1	1	0	6	0	9	4	15	3	30	44	216	104	163	151
Chaupati	11	9	7	1	0	0	0	0	0	0	0	0	0	0	1	0	2	1	4	0	13	4	40	9	106	45
Walkeshwar ...	59	25	19	7	2	0	0	0	0	0	1	0	0	0	2	0	0	0	3	2	12	1	30	2	66	11
Mahalakshmi ...	33	46	40	13	7	0	0	0	0	0	0	0	0	0	0	0	3	1	5	0	26	4	46	12	93	44
Masagon	106	53	35	13	13	6	13	1	5	3	2	0	13	3	4	1	11	4	17	6	55	15	236	67	99	133
Tarwadi	53	17	31	5	3	1	6	2	1	1	0	0	2	0	2	2	4	0	13	4	17	13	29	20	43	62
2nd Nagpada ...	24	14	21	15	10	2	3	0	0	0	1	0	3	2	16	2	6	1	33	11	73	36	101	34	26	23
Kamathipura ...	66	61	52	33	33	15	3	3	5	2	17	1	23	3	47	12	60	22	65	17	193	131	301	167	152	137
Tardeo	53	39	37	14	14	3	6	1	0	0	3	1	1	0	7	2	15	4	16	10	70	32	152	63	34	109
Byculla	153	93	55	27	36	10	13	4	4	4	1	1	9	9	12	3	15	5	13	10	142	63	303	123	313	353
1st Nazpada ...	36	24	21	9	9	1	4	0	0	0	0	0	6	1	6	1	6	0	21	3	23	32	35	22	43	29
Parel	101	127	27	25	3	5	0	1	0	2	0	0	2	3	4	0	0	2	3	4	30	23	47	36	154	213
Sewri	49	16	14	7	3	2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	4	1	12	3	11	13
Sion	101	157	66	64	6	5	0	0	0	0	0	0	0	0	2	0	0	0	0	0	9	7	13	15	64	30
Mahim	323	165	131	55	22	1	1	0	0	0	1	0	0	0	2	0	0	0	0	0	24	9	42	19	112	40
Worli	120	77	32	39	12	5	0	0	0	0	0	0	1	1	3	0	5	2	4	2	23	9	72	32	102	91
Totals ...	1,815	1,201	1,160	513	414	110	148	44	44	23	107	26	212	70	272	65	355	102	745	228	2,806	1,230	4,594	1,641	3,303	2,390

CHAPTER VII.

MORTALITY.

Table A shows the recorded Plague attacks and the recorded Plague deaths from the commencement of March 1897 to the end of March 1898, a period of 13 months. The figures are taken from the daily returns of the Municipal Health Office. Owing to the imperfect system of death registration, they are not a true record, but, assuming that the vitiating error is a constant one, the table exhibits the monthly steps, whether of ascension or of declension, made by the epidemic in each section as well as in the total area of the Island. It will be observed (1st column) that the Island of Bombay is divided into 32 sections.

A glance at one of the maps which accompany this Report will show that the first sections mentioned in the table, namely, Upper and Lower Colaba, form the extreme promontory which divides the Back Bay from the open sea. Upper Colaba is occupied chiefly by the British Troops.

Looking again at the map, it will be seen that the last five sections are situated in the north of the Island, where there are large open stretches of country and a correspondingly thin population. Walkeshwar, again, which occurs near the middle of the list of sections, is one of the promontories which form the Back Bay, and is largely inhabited by Europeans. Mazagon, Byculla and Mahalakshmi may be called border sections.

On looking at the figures it will at once be perceived that in March 1897, the extreme sections, and to some extent the border ones, were still receiving their visitation from a departing epidemic which had completed a full and virulent course in the interior—the densely crowded, and the insanitary parts of the City in which it made its first appearance.

Looking on now to the months of November and December we see the rise of the second epidemic in the densely crowded and insanitary sections, at a time when the extreme sections were comparatively free. The gradual spread into these extreme sections, together with a decline in the interior sections some three months later, is again very marked.

TABLE B.

Comparative Sectional Plague Mortality, MARCH 1897—MARCH 1898.

Sections in order of Mortality.	Deaths.	Population.	Rate per 10,000.	Sections in order of Mortality.	Deaths.	Population.	Rate per 10,000.
Tardeo	405	18,980	213	Market	319	44,751	74
Kamathipura	613	29,208	208	2nd Nagpada	140	18,768	74
Sion	319	19,601	162	Fort, North	235	32,047	71
Mahim	289	18,508	156	Phanaswadi	170	24,069	70
Byculla	730	47,403	154	Sewri	42	6,063	69
Parel	439	28,740	152	Mahalakshmi	113	7,004	66
Girgaum	331	27,000	120	Chaupati	69	11,512	62
Kumbharwada	375	32,209	116	Umarkhadi	328	52,468	62
Middle & Lower Colaba...	156	13,622	114	Tarwadi	127	21,298	59
1st Nagpada	127	11,133	114	Bhuleshwar	208	38,363	54
Dhobi Talao	459	39,950	112	Upper Colaba	23	4,335	53
Dongri	317	30,320	104	Khara Talao	142	27,035	52
Worli	258	25,493	101	Walkeshwar	48	12,990	38
Mazagon	325	33,640	96	Chakla	119	32,197	36
Khetwadi	269	28,814	93	Esplanade	28	10,064	27
Mandvi	290	37,295	77	Fort, South	7	3,951	17

TABLE B.

Table B shows the 32 sections of the Island in their order of comparative Plague mortality according to population. The period covered by this table is the same as that covered in table A. Each section is therefore fairly treated, being included both in the descending period of one epidemic and in the ascending period of another one.

TABLE C.

Mortalities of Ascending Periods of 1st and 2nd Epidemic.

1st *Epidemic*, 1896-97.

Week ending—	Total Mortality.	Average Mortality, 1891-96.	Recorded Plague.	Probable Plague.
October 20th, 1896	606	477	81	129
„ 27th, „	698	470	119	129
November 3rd, „	668	443	159	225
„ 10th, „	623	449	120	174
„ 17th, „	704	462	187	242
„ 24th, „	760	446	238	314
December 1st, „	772	457	253	315
„ 8th, „	1,051	460	456	591
„ 15th, „	1,310	470	777	840
„ 22nd, „	1,416	470	782	946
„ 29th, „	1,853	469	1,179	1,384
January 5th, 1897	1,711	494	1,194	1,217
„ 12th, „	1,638	484	1,018	1,154
Total	13,810	6,051	6,563	7,759

2nd *Epidemic*, 1897-98.

Week ending—	Total Mortality.	Average Mortality, 1892-97.	Recorded Plague.	Probable Plague.
December 14th, 1897	785	575	95	210
„ 21st, „	835	629	158	206
„ 28th, „	975	652	200	323
January 4th, 1898	1,061	724	302	337
„ 11th, „	1,307	712	450	595
„ 18th, „	1,540	754	651	786
„ 25th, „	1,726	748	834	878
February 1st, „	1,871	743	927	1,128
„ 8th, „	2,067	836	1,113	1,237
„ 15th, „	2,195	775	1,257	1,420
„ 22nd, „	1,974	758	1,082	1,216
March 1st, „	2,080	716	1,097	1,364
„ 8th, „	2,184	688	1,283	1,496
Total	20,600	9,310	9,449	11,290

TABLE C.

Table C exhibits the mortalities of the two Bombay epidemics during their periods of ascension. Accepting the increase in Plague in Bombay from the middle of December as marking the beginning of a fresh epidemic, the thirteen weeks or three months spread of the epidemic came to a close at the end of the first week of March. In calculating the waxing three months of an epidemic, the difficulty is to fix the initial week. It is not till the decline sets in that the date of the true epidemic increase can be determined. In the present case the decline began from March the 20th: this supports the view that the second epidemic dates from about the middle or the third week of December.

The thirteen weeks period, which is indicated by the total figures for both epidemics, is very largely borne out by the individual section figures at Table A, but it would perhaps be rash to state positively that this is a true feature of Plague in general or even of Bombay Plague in particular.

It should be here noted that since from various causes there are observable discrepancies in the returns of *recorded* Plague from different quarters, the probable or *estimated* Plague figures are best obtained by the process of subtracting the average mortality for any given period of the five years preceding 1896, from the mortality for the corresponding periods in 1897 or 1898, and assigning the difference to Plague. A comparison of this result with the *recorded* figures gives a fair line of the course of the epidemic.

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TABLE D.

Monthly Death-rates in Bombay during the Plague Visitations of 1896-97 and 1897-98, calculated from Statistics in the Plague Charts of these Years.

1896-97.

Months.	Total Mortality.	Calculated Population.	Death-rate per 10,000 per Month.
1896.			
November...	3,024	780,000	38·8
December...	6,243	740,000	84·4
1897.			
January	7,627	480,000	158·9
February	6,732	437,000	154·0
March	5,438	474,000	114·7
April	3,578	581,000	61·6

1897-98.

1897.			
November...	2,977	855,000	35·7
December...	8,794	875,000	48·4
1898.			
January	6,886	838,000	82·2
February	8,316	757,500	109·8
March	9,210	712,500	129·2
April	5,097	74,400	68·5

Remarks.—It is noticeable from the chart that the plague visitation was more than a month later this year than last. The mortality in November 1896 should therefore be compared with that in December 1897, December 1896 with January 1898, and so on.

TABLE D.

In connection with the two preceding tables, Table D shows the death-rates per 10,000 per month during the two epidemical periods. It is calculated from the Plague charts which accompany this Report. The estimated variations in population shewn on these charts are based on calculations made by Mr. Rimington, the Head of the Tramway Company. Mr. Rimington mainly, though not entirely, bases his estimates on the totals of tram-passengers. But as many thousands of the poorest classes do not use the trams, all of these might leave the City without affecting the tramway figures. In some ways the official movement statistics are more trustworthy. But the very elaborate completeness of their details detracts from their value.

According to the Movement statement between July and December 1897, departures were steadily, though slightly, in excess of arrivals, the excess aggregating about 50,000 during the six months. During the three first months of the present year the returns show a further deficiency of about 100,000. If, as is agreed, Bombay was full in June 1897 the number may have been about 850,000. The total during the recent epidemic would then vary from about 750,000 in January to 700,000 in March. Mr. Rimington's estimates agree as to the total during the epidemic. They differ in holding that in June 1897 the total was less than 850,000 and that it rose towards the end of the rains till in October-November it was little short of 900,000. A large element of error must be expected in a statement dealing with such masses of people on what are little more than estimates. On the whole, however, opinion favours Mr. Rimington's view that the population was abnormally high in October. Be that as it may, the total during the recent epidemic was probably between 700,000 and 750,000.

TABLE E.

COMPARATIVE PLAGUE MORTALITIES OF BOMBAY AND THE MOFUSSIL EPIDEMICS, 1896-98.

City.	Population, 1891.	Accepted Population during Week of Highest Mortality.	Highest Mortality.		Mortality on Bombay Basis, 750,000.	
			Week.	Average day.	Week.	Day.
Sholapur ...	6,154	30,782	1897 Nov. 26th—Dec. 3rd			
			448 ...	64	10,909	1,558
Poona II ...	149,793	74,895	1897 Oct. 29th—Nov. 5th			
			460 ...	66	4,600	657
Karachi ...	97,009	48,500	1897 Jan. 28th—Feb. 4th			
			295 ...	42	4,562	651
Bombay I ...	821,764	470,000	1897 Jan. 12th—19th			
			1,472 ...	210	2,350	335
Surat ...	108,631	54,315	1897 Nov. 5th—12th			
			150 ...	21	2,083	297
Bombay II...	821,764	750,000	1898 March 11th—18th			
			1,611 ...	230	1,611	230

The comparative statement, Table E, shows that as regards intensity, in proportion to the estimated population at the time, the last epidemic in Bombay was less severe than the preceding one; that it was about the same as the Surat epidemic; a little more than one-third of the intensity of the Karachi and the second Poona epidemics, and not much more than one-seventh as acute as the Sholapur epidemic. In the case of each of these outbreaks the figure taken as the maximum daily death is the daily average of the highest week. Apart from the law that the larger the population the smaller the proportion of mortality, Bombay's comparatively mild mortality is doubtless in great measure due to the greater comparative cleanness of the city. At the same time a share in so favourable a result may be fairly claimed for the vigour and completeness of the measures taken to combat the Plague.

TABLE F.

European Plague Mortality.

1st Epidemic. 11th November 1896—30th April 1897.			2nd Epidemic. 12th December 1897—April 1898.			
	Attacks.	Deaths.		Attacks.	Deaths.	Remains.
Europeans, pure ...	8	1	Europeans, pure ...	11	9	6
Europeans, domiciled ...	21	8	Europeans, domiciled...	17	4	10
Eurasians	41	13	Eurasians	22	10	6
Indian Christians ...	18	12	Indian Christians ...	9	7	1
European Jews ...	8	1	European Jews ...	1	1	...
Total...	56	35	Total...	60	25	23

Among the patients entered in 1897-98 as Europeans were one Jew and nine Indian Christians. Of Europeans born and brought up in India the details are: attacks 17, deaths 4. Of English-born Europeans, the details are: attacks 11, deaths 3. In January 1898, as the infection ward in the old section of St. George's Hospital was full, a fenced enclosure was set apart on open Port Trust land immediately to the east of St. George's Hospital, and timber huts were built with accommodation for 18 patients. The results have been satisfactory.

TABLE G.

RETURN SHEWING THE MORTALITY FROM PLAGUE WITH PERCENTAGE OF DEATHS AND CASES IN ALL HOSPITALS.

Government Hospitals.

No.	Hospital.	District.	Admissions.		Deaths.		Mortality.	
			Total.	Plague.	Total.	Plague.	General.	Plague.
1	Arthur Road	Byculla	4,121	1,917	.....	1,410	.....	73·55
2	Grant Road	Kamathipura ...	2,102	1,201	1,090	952	51·85	79·26
3	Parel Government House	Parel	992	587	488	435	45·16	74·10
4	Police Hospital	Tardeo	45	.....	27	.....	60·00	.....
5	Modikhana	Esplanade	893	252	580	564	64·94	76·32
6	Narielwadi	Mazagon	423	.....	215	.....	49·00	.....

Table G shows, so far as statistics have been obtainable, the mortality of Natives (1) in Public Hospitals (2) in Private Hospitals.

It is to be noted with regret that comparatively few of the Private Hospitals have kept any trustworthy record of the cases treated in them. The native assistants, in many cases, had no previous experience in keeping registers, and an examination of their books shows how totally worthless the statistics published must necessarily be. A certain number of cases were of necessity sent to hospitals for observation when found suffering from fever and, indeed, a fairly large number of persons applied voluntarily for admission under the impression that they were suffering from Plague, who subsequently proved to be suffering from diseases other than Plague. Of these cases the registers show no record : all alike are entered as cases of "Plague," yet the fact that many cases were detained in hospitals, before being discharged cured, for periods varying from 1 to 7 days only, conclusively proves that they were not suffering from Plague.

Every endeavour has been made to ascertain the actual Plague mortality : where this has not been possible, the mortality, including all cases admitted, has been stated under the heading "General Mortality."

An attempt to compare the results of these two classes of hospitals has led to considerable doubt in certain quarters as to whether a well regulated hospital, with its staff of trained nurses and various other appointments, was of any special advantage. Such a comparison is, however, worthless and must necessarily be misleading till a more satisfactory system of supervision can be exercised in regard to the Private Hospitals.

The comparatively low rate of mortality amongst Europeans is undoubtedly largely due to the early stage of the disease at which they placed themselves under suitable conditions and treatment. The high rate of mortality at all the hospitals has almost invariably been attributed by the Medical Officers to the late stage at which the patients were sent in.

Private Hospitals.

No.	Ward	Hospital.	District.	Admission.		Deaths.		Mortality per cent.		Report, page
				Total.	Plague.	Total.	Plague.	General	Plague.	
1		Adamjee Peerbhoy, Churney Road, for Borah Community.	Girgaum ...	222	207	129	129	58·10	62·01	
2		Beni-Israel, Connaught Road.	Tarwadi ...	13	11	5	4	38·46	40·00	
3		Bhattia, Mint Road, by Govindji Thakersey Mooljee.	Fort, North...	264	?	191	?	72·80	?	
4		Brahma Kshatri ...	Bhuleshwar .	40	?	32	?	80·00	?	
5		Chinese	.....	...	...	...	...	...	...	
6	B	Cutchi Memon, Jackaria Musjid Street.	Mandvi ...	134	77	45	45	33·58	58·44	
7	B	Dariasthan Lohana, DeSouza Street.	Do. ...	457	?	338	?	73·96	?	
8		General Mahomedan, Northbrook Gardens	Kumbharwada.	297	?	164	?	55·21	?	
9		Greaves, Cotton & Co.	Worli ...	62	?	33	?	53·22	?	
10		Hallai Memon, Memonwada Street.	Umarkhadi ..	62	55	32	32	51·61	58·18	
11	C	Haji Kasam Josoob, Abdul Rehman Street	Market ...	52	?	29	?	55·76	?	
12		Hindu Fever Hospital.	Khetwadi ...	771	695	540	528	70·03	75·97	
13		Imambara, for Moguls by Aga Abdul Hussein.	Umarkhadi...	34	?	18	?	52·94	?	
14		Islam Nazdevi, Surtee Dawoodbhai Mussabhai Hospital.	Chakla ...	84	?	46	?	54·76	?	
15		Jain Hospital, Pinjrapol.	.....	588	510	396	381	67·34	74·70	
16		Jain Parel Hospital...	.....	326	336	232	232	71·1	75·81	
17		Jullaha (Sooni Mahomedan) Hospital, Ripon Road, Madanpura.	Byculla ...	546	284	271	200	49·64	70·42	
18		Kapol and Lad Joint Hospital.	Bhuleshwar..	264	172	131	131	49·62	76·16	
19		Khatri Mahomedan Hospital, Bapu Khote Street, Null Bazar.	Do. ...	14	?	7	?	50·00	?	
20		Kolsa Moholla Memon Mahomedan Hospital.	.....	35	26	21	21	60·00	30·76	

Private Hospitals—continued.

No.	Ward	Hospital.	District.	Admission.		Deaths.		Mortality per cent.		Report, page
				Total.	Plague.	Total.	Plague.	General	Plague.	
21		Khatrya Hospital, Churney Road Gardens.	.....	43	40	32	31	74·41	77·50	
22		Maratha Hospital, Connaught Road—								
		(*a*) "Under English treatment."	.....	981	738	645	542	65·74	73·44	
		(*b*) "Under Native treatment."	.....	261	235	176	162	67·43	68·93	
23		Marwadi and Fattepuria Hospital.	.....	86	?	65	?	75·58	?	
24		Modh and Porwad Hospital, Pinjrapole.	.....	58	58	44	44	75·86	75·86	
25		Mahomed Ebrahim Khojah Hospital, Dontad Street.	.....	176	159	85	84	48·92	52·83	
26		Nizampura Fever Hospital, Bapu Hajan Street, Bhendy Bazaar.	.....	71	?	36	?	50·70	?	
27		Parsi Fever Hospital.	.....	...	...	...	...	...	...	
28		Pathare Prabhu Hospital, Churney Road Gardens.	.....	40	40	25	25	62·5	62·5	
29		Port Trust Hospital...	Dongri ...	158	157	119	119	75·31	78·80	
30		Shikarpuri and Multani Hospital, Arab Gully Lane.	.....	14	?	10	?	71·42	?	
31		Telegu Hospital, Bazar Street.	Kamathipura	241	216	174	157	72·19	72·86	
32		Textile Mill Hospital.	.....	6	5	5	5	83·33	100·00	
33		Thakurdwar Lohana Hospital.	.....	70	19	14	14	70·00	70·68	
34		3rd Bhoiwada Hospital	Bhuleshwar...	147	?	114	?	77·55	?	
35		Vaishnav Samprayada Maharajah's Servants' Hospital.	.....	15	?	10	?	66·66	...	
36		Vassanji Trikamji Hospital, Clive Road.	Dongri ...	121	117	89	89	73·55	76·06	

CHAPTER VIII.

HOSPITALS.

In the middle of June 1897, with the rapid decline of the Plague, all the temporary hospitals were closed owing to the monsoon. Parel, Grant Road, and Arthur Road contained only a few acute cases, and it was therefore decided to close Grant Road, to gradually clear Parel, and to concentrate all Plague patients at Arthur Road.

This arrangement necessarily released most of the English Nurses :—

Miss Jones.	Miss Morey.
„ Robinson.	„ Katsch.
„ Wheatley.	„ Oram.
„ Coleman.	„ Franklin.
„ Steele.	„ Kendall.
„ Reynolds.	„ Hale.

Several of these were desirous of joining the Indian Nursing Service at once, *viz.* :—

Miss Robinson.	Miss Coleman.
„ Morey.	„ Reynolds.
„ Wheatley.	

Others expressed their readiness to do so after completion of their year's current engagement, *viz.* :—

Miss Steele.	Miss Franklin.
„ Kendall.	„ Oram.

However, Miss Franklin and Miss Oram being still in Cutch Mandvi, Miss Steele and Miss Wheatley were the only two who could be spared. The first two ladies shortly afterwards, on their return from Cutch Mandvi, were directed to report to the Surgeon-General, and subsequently proceeded to the Front. Miss Wheatley was prevented by ill-health from joining them in August. In the beginning of July Miss Morey was appointed Lady Inspector at Khana Junction. Miss Coleman and Miss Reynolds were temporarily engaged at the Committee Office. Thus only three Nurses—Miss Jones, Miss Hale and Miss Wheatley—were on duty at Arthur Road ; but shortly afterwards, with the outbreak of cholera, Miss Reynolds and Miss Coleman were detailed

for duty in the Cholera Ward at Arthur Road, whither Miss McDonald Ritchie was also despatched a month later to take charge of that ward.

Meanwhile (July 15th) information was received from the Secretary to Government to the effect that the Government of India and the Local Government had been addressed as to the possibility of their affording employment for the Nurses, who in the meantime were directed to report themselves to the Surgeon-General as they became available.

At this time Miss Robinson and Miss Kendall were on leave, Miss Oram an invalid, Miss Morey at Khana Junction, and Miss Franklin and Miss Katsch fit for duty.

With the increase of Plague in the Mofussil during the month of September, and its recrudescence in Bombay after its rapid decline in July, a further supply of Nurses and Doctors was called for from the Imperial Government, and at the end of October the following ladies reached Bombay, and were posted as follows :—

Miss Green	Arthur Road ...	Transferred to Maratha.	
„ Mill	Do. ...	Do.	to Parel.
„ McDougal	Do. ...		
„ Dowson	Do. ...		
„ Harris	Do. ...		
„ Hitchman	Do. ...	Transferred to Parel.	
„ Truman	Do. ...	Do.	do.
„ Moyd	Do. ...	Do.	do.
„ Mowat	Sholapur.		
„ Crowdy	Parel ...	Transferred to Surat.	
„ Tetley	Grant Road ...	Transferred to Parel. (11-12-97.)	
„ Phillips	Arthur Road.		
Mrs. Potts	Do.		

The distribution of Indian-trained Nurses during the summer and autumn was as follows :—

July—September ...	Arthur Road ...	Mrs. Baker, Mrs. Gibson, Miss Fern, Miss Christie, Nurse Thakoobai.
	Grant Road ...	Mrs. Nesbitt, Mrs. Shehan.
October & December ...	Arthur Road ...	Miss Crichton, Mrs. Storrie, Miss Simpson, Mrs. Young, Mrs. Rosario, Mrs. McDonald, Mrs. Manning.
	Grant Road ...	Miss Crichton, Mrs. Rimington, Miss Fernandez, Mrs. Manning.

In January and February the services of all available Nurses became requisite, and the following additional Nurses were on duty :—

Arthur Road ...	Nurse	Moore, Canon, Yates, F. Yates, Lynsdale, Hanson,
Grant Road ...	„	Beale, Winscom.
Parel	„	Overthrow.
Modikhana ...	„	Saye.
Maratha ...	„	Lazarus.

On the 12th of February 25 more English Nurses arrived from England, and were posted to the several hospitals :—

Arthur Road	... Nurse	Foxlee, Scott, Gardiner, Pearse, Chick, Bleaney, Greening, Cracknell.
Grant Road	... „	Truman, Richardson, Evans.
Modikhana	... „	Grieveson, Wood, Brown, Campbell, Hodges, Buckley, Snowdon.
Narielwadi	... „	Murphy, Bradshaw, Riley, Hylands.
Police Hospital	... „	Smith, Harvey.

It was difficult to house so many ladies at once. Old Government House, Parel, could accommodate no more. Accordingly a suite of rooms was taken at the Adelphi Hotel and put in order and furnished by the Committee, while tents and huts were erected at Narielwadi and Modikhana for the staff at those hospitals.

With so many Nurses it was necessary to select one of them as responsible head to organize and direct the others under the requirements of the Committee, and Miss Robinson was accordingly appointed Lady Superintendent of Nurses, the duties of which post she carried out with commendable zeal and capacity. In April she resigned the post of Lady Superintendent to join the Indian Nursing Service, and Miss Green was appointed in her place.

The Committee are glad to state that the whole band of English Sisters and Bombay Nurses have performed their duties with admirable credit and patience under the severe strain thrown upon them by the novel, harassing, and painful work that they were called upon to do. They were suddenly placed in the midst of all the trying circumstances of native Plague hospitals, with no knowledge of the language or customs of their patients; and they had also to face the unknown dangers of a dreaded and loathsome disease. Further, they experienced the terrors of the fire at Modikhana Hospital and of the riots, and on both occasions behaved with great courage and fortitude.

The Committee have greatly appreciated the services of the whole Nursing Staff, and are confident that their devoted and tender care of their patients has created a revolution in the attitude of a considerable section of the people of Bombay towards hospital treatment.

The services of Miss Robinson, the Lady Superintendent of Nurses, of Miss Green at the Maratha Hospital, of Miss Kendal at Grant Road, of Miss Bridge at Narielwadi, and of Miss Winscom at Modikhana, deserve special mention.

It is with the deepest regret that the death from Plague has to be recorded of Miss MacDougal, on the 22nd February 1898. This lady was a distinguished Nurse from St. Bartholomew Hospital, London, and was a victim to the cause to which she truly gave her life.

Medical Officers.

As the Epidemic heightened, the Hospital Staff was increased both in number and quality. During January the staff of Medical Officers in charge of hospitals was increased. Of those who were especially successful as heads of hospitals were Dr. Hutchinson at Grant Road, Dr. Julius at Modikhana and Dr. Choksey at Arthur Road.

Private Hospitals.

The system of Private Hospitals inaugurated last year by the Committee has been adhered to and considerably extended during the second Epidemic. In spite of much adverse criticism, it has been found that Private Hospitals, open to all members of any particular caste or sect, have as a whole been a distinct success. The many intricate questions relating to caste habits, food, religious scruples and other similar difficulties, have in this way been overcome and the various apprehensions and fears of the people have been set at rest. The result has been a moral and practical support to the measures adopted by the Committee that has proved invaluable. To the munificent founders of these hospitals and to the gentlemen who devoted so much time to their management, the Committee are most grateful, and cordially acknowledge their good services for the public benefit.

The choice of a building satisfactory in every sanitary detail, together with convenience of position for the special caste for whom it was intended, has often proved most difficult. Undoubtedly there has been much left to be desired in this respect as regards certain private hospitals: yet no effort has been spared to make them as efficient as possible, and in no case can it be shewn that any private hospital has proved a source of infection to its neighbourhood. The Jain Hospital, the Kapol-Lad Bania Hospital, and the Modh Porwad Hospital, all in the Bhuleshwar Ward, have done excellent service. On the other hand, Dariastan Street, the site of the Lohana Hospital, is too narrow and too crowded for safety, and the management of its sanitary details has not been entirely satisfactory.

Among Musalman Hospitals the Khojah Hospital in Don-Tod Street, though in a crowded locality, was too carefully managed to be a source of anxiety. Among the hospitals whose open sites free them from the risk of spreading infection are the Maratha, Beni-Israel, Parsi and Jain Hospitals in the Connaught and neighbouring Parel Roads;

also the Musalman General Hospital in the Northbrook Gardens and the Jullaha Hospital in Ripon Road. The Maratha Hospital was opened about the end of January, and the Northbrook Garden Muslim Hospital a little earlier. They were filled almost as soon as they were open, and have continued well filled till after the close of April.

During the cursory examination of a large number of persons in dimly lighted houses and chawls it was frequently impossible to say at once if a case was Plague. In the best interests of the patient and of the other inmates of the house, it was necessary to place such persons under observation: and in all Government and in most private hospitals separate accommodation was provided for these suspicious fever cases.

The result of careful enquiry at the Hospitals shews that the number of cases that were thus sent in, without sufficient reason, amounted to only a fraction per cent. This is totally at variance with the groundless statements circulated by certain persons of influence and position, whose false accusations did incalculable harm. Yet in spite of their adverse criticism, a large number of persons voluntarily applied for admission to the Hospitals and few who were admitted failed to shew their appreciation of all that was done for them.

Special Reports.

The special reports which now follow are in almost every instance only a very brief statistical record of the work done. This is in part due to the fact that the Epidemic still (April) maintains a firm hold on the city, and in part to the absence of any important advance in our knowledge of the clinical, therapeutical, or pathological aspects of the disease. During the height of the Epidemic the pressure of work in the hospitals has been so heavy that any systematic research work has been impossible.

In reference to the Government Hospitals, both Narielwadi and Modikhana have been most unfortunate in having frequent changes in their Medical Officers. This has greatly interfered with the production of any detailed report. Arthur Road claims the largest number of admissions, namely, 1,917 Plague cases in the past 9 months. But during this epidemic the demands of routine work on Dr. Choksey, himself in poor health from overwork, have been too incessant to permit of his making a clinical report on the material to his hand, such as he contributed with so much effect last year.

In this connection it is to be noted also with regret, that comparatively few of the Private Hospitals have kept any trustworthy record of the cases treated in them.

PAREL HOSPITAL.

STATISTICAL AND CLINICAL RECORD OF WORK FROM THE 15TH NOVEMBER 1897 TO 31ST MARCH 1898,
BY SURG.-CAPT. W. E. JENNINGS, M. B., C. M., L. M. S.

1. Parel Plague Hospital was opened as a convalescent hospital on the 15th of November 1897, extended as an acute hospital in the following month, and remained as such on the 31st of March 1898.

2. During that period 992 patients were admitted, of whom 426 recovered, 488 died and 78 remained under treatment.

3. The following table gives details of those admitted, with reference to caste, sex, and results :—

	Total.	Males.	Females.	Died.	Recovered.	Remained.
European	.....	.....	.....	.....	.....	.....
Native Christian	129	90	39	88	32	9
Jews	4	3	1	2	2	0
Parsis	41	25	16	29	12	0
Mahomedans...	40	28	12	16	22	2
Hindus	778	547	231	353	358	67
Total ...	992	693	299	488	426	78

4. The following table gives particulars of those admitted, with reference to age:—

Infants.	2 to 5 years.	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 and upwards.
1	20	79	243	360	164	84	33	8	Nil.

5. The following table gives details referring to the position of buboes :—

Situation of Bubo.	Total.	Percentage	Males.	Females.	Died.	Recovered.	Remained.
Right axilla ...	68	6·9	44	24	39	24	5
Left axilla ...	64	6·5	47	17	35	21	8
Right femoral ...	31	3·1	23	8	15	12	4
Left femoral ...	25	2·5	19	6	12	9	4
Right inguinal ...	192	19·4	137	55	114	63	15
Left inguinal ...	150	15·1	107	43	99	34	17
Right cervical ...	27	2·7	21	6	11	11	5
Left cervical ...	14	1·4	12	2	10	3	1
Right parotid ...	12	1·2	5	7	5	6	1
Left parotid ...	8	0·8	3	5	4	4	0
Multiple... ...	57	5·7	42	15	35	19	3
No Buboes ...	344	34·7	233	111	109	220	15
Total	992	.....	693	299	488	426	78
Grand Total ...	992						

6. The following table gives details relative to the distribution of buboes, relative to sex, in adults and children :—

Distribution of Bubo.	Men.	Women.	Boys.	Girls.
Right axilla	39	21	5	3
Left axilla	45	14	2	3
Right femoral	22	8	1	0
Left femoral	18	6	1	0
Right inguinal	128	38	5	5
Left inguinal	102	38	5	5
Right cervical	20	4	1	2
Left cervical	11	2	1	0
Right parotid	5	6	0	1
Left parotid	3	4	0	1
Multiple	39	11	3	4
No Buboes	221	101	12	10
Total... ...	653	266	40	33
Grand Total... ...	992			

7. On November 15th, 1897, the Resident Medical Officer was Dr. Pais and the staff was as follows :—

Sister 1, Nurses 2, Assistants 3, Clerk 1, Ward-boys 8, Ayahs 2, Cooks 3, Sweepers 5, Dhobi 1.

8. On 8th January 1898, Dr. Pais was relieved by Dr. Castellote and in consequence of an increased influx of patients the subordinate staff was somewhat strengthened. On 19th February 1898, Dr. Castellote having been placed in charge of the District Health Camps, Dr. Clemow relieved him, and the Female Wards were placed in charge of Dr. (Miss) Alice Corthorn on the 5th March 1898. The subordinate staff then stood as follow :—

Sisters 4, Nurses 4, Assistants 5, Compounder 1, Clerk 1, Ward-boys 22, Ayahs 11, Cooks 4, Sweepers 18, Dhobis 2.

9. During the period under report, fifty cases of Acute Plague were treated by Dr. Felix Jassenski by the injection of an antitoxic serum prepared in the Imperial Institute of experimental Medicine in St. Petersburg, and I am obliged to him for the following particulars which he has permitted me to incorporate in this report.

The serum was obtained from the blood of horses rendered immune by the repeated injection of cultures of Plague bacilli in which the bacilli had been killed by heat. Cases were not specially selected for this treatment, but in order to obtain two entirely comparable groups of inoculated and control cases, Dr. Clemow and Dr. Jassenski daily divided

the newly admitted cases into two groups—one containing doubtful and moribund cases, and the other cases of undoubted Plague (not obviously moribund). The inoculated and the control cases were taken solely from the second group, every alternate one being inoculated, and the remainder forming the control cases. At first the quantity of serum injected was 20 c.c. daily in one dose, later on 10 c.c. were injected in the evenings as a second dose, and still later the morning dose was increased to 30 c.c. These doses not having any effect, they were further increased to 40 c.c. in the morning and 20 c.c. at night (more than half of the cases were treated with the latter doses). In seventeen of the cases the blood was examined for bacilli and in thirteen of these the bacilli were found in a drop of blood obtained from the buboes during life, and in one case 1½ hours after death. In twenty-six cases out of thirty-four albumen was found in the urine.

The following tabular statement gives comparative results of the inoculated and control cases :—

Results.	Inoculated.	Control.
Discharged cured	2	0
Deaths	39	40
Under treatment	1	1
Convalescent	8	9
Totals ...	50	50

Dr. Jassenski sums up the results of his experiments as follows :—

"In general terms the effects of the injections of the Russian serum have been negative. In some cases the temperature fell and the patient felt better after the injections, but it is doubtful whether the phenomena should be ascribed to the injections. No harmful results were noted in any case, whether on the heart, the kidneys, or any other organ. Finally, from the above results, but one conclusion is possible, that the serum prepared in St. Petersburg and employed by me in the above cases, is an absolutely indifferent substance, with no influence, either for good or evil, on the course of Acute Plague."

10. Various other methods of treatment were adopted, based upon special indications in each case, but no method was observed to have any advantage over others, and success depended mainly on early attendance to cases, absolute rest until about a week after the subsidence of all acute symptoms, supporting the powers by stimulants, and relieving insomnia by narcotics.

11. Appended to this report are notes of twelve cases of special interest, six selected by Dr. Clemow, and six by Dr. Alice Corthorn.

12. It is with great regret that I have to mention the death of Hospital Assistant Waman Narayan, who fell a victim to the Plague, contracted in a *post-mortem* examination. He was an able and willing worker and in him the Department has lost a most promising member. I have also to record with regret the death from Plague of one hospital sweeper and one ayah, both good workers.

13. The above is a report of the entire work of the Hospital during the period under consideration. Of the 992 cases on which the statistics are based, 247 were convalescent patients transferred from other hospitals. Of this number 2 subsequently died. Observation and cases other than Plague numbered 158 with 51 deaths. The actual return of Acute Plague cases admitted and treated is therefore as follows :—

Cases admitted	587	Plague mortality 74·10.
„ discharged	152	
„ died	435	

Report of six cases treated in the old Government House Plague Hospital, Parel.

(By Frank G. Clemow, M.D., Edin., D.P.H., Camb.)

CASE I.—BUBONIC PLAGUE.—ACUTE KERATO-IRITIS; LATE DEVELOPMENT OF SECONDARY BUBO; EXHAUSTION AND DEATH ON THE 15TH DAY.

Gunpat Khundoo, Hindu male, aged 21 ; admitted to hospital March 6th, 1898, with a history of three days' illness.

State on admission.—The patient is semi-conscious and restless, at times delirious and violent. The conjunctivæ deeply injected, and there are signs of commencing conjunctivitis. The tongue shows the characteristic greyish-white coating covering the dorsum and leaving the tip and edges pink and clean. The pulse is rapid and weak. The bowels have not been opened for four days. There is no cough. There is severe frontal headache. In the right groin is a very tender bubo, the size of a walnut. The urine is acid and contains a considerable quantity of albumen. The temperature is 102·4° ; pulse 120 ; respirations 28 ; the spleen is not enlarged.

Treatment :—Rest, milk diet, poultices to the bubo. Four ounces of rum in the 24 hours and the following :—.

Quin. Sulphat, grs. V.
Acid Hydrobromic dil., m. X.
Sp. Aetheris Nitrosi, m. XXX.
Potass. Nitrat, grs. V.
Liqr. Strych., m. III.
Aquam, ad. oz. I.
every four hours.

Later, he was ordered hypodermic injections every four hours, each injection containing Liq. Strychnia, m. IV, and Sp. Eth. Sulph., m. XV; Inject. Morph., Hypod. m. III, was added to the injections when the delirium was troublesome.

Course of the disease :—March 8th signs of commencing Kerato-iritis in both eyes. Ordered Atropia drops to be repeated until the pupils are fully dilated ; frequent bathing of the eyes with Boracic lotion, and a pressure bandage. At 3 p.m. the patient received hypodermically 20 c. c. of an antitoxic serum prepared in the Imperial Institute of Experimental Medicine in St. Petersburg. The injection was made by Dr. Jassenski, the Principal Member of the Plague Commission recently sent to India by the Russian Government. This was the first case so inoculated.

Between March 8th and 12th (inclusive) a daily injection of 20 c. c. of serum was given. The temperature remained high until the 13th, when it fell to 99·6°. From that date onwards it remained normal with one slight rise to 99° on the 17th, and the injections were consequently discontinued. The general condition showed some improvement for a few days. The tongue cleaned completely and the pulse became slower and stronger. Delirium, however, recurred at intervals and sleeplessness was troublesome. On March 11th, there was nausea and hiccough which was controlled with difficulty. From the 14th to the 16th there was troublesome vomiting which was scarcely affected by the ordinary remedies. The Kerato-iritis continued to increase ; the corneæ became quite opaque and a large ulcer formed in the centre of the left cornea. The Kerato-iritis also increased. The bubo gradually became larger, till it measured 5 × 3 inches ; suppuration did not occur. On March 16th a diffuse, hard, tender swelling appeared in the right neck, and this slowly increased in size during the remaining 48 hours of life, but showed no signs of suppurating. On March 18th, hæmorrhage occurred from the gums, which had become soft and spongy as in scurvy, and the patient died of exhaustion at 10-5 p.m. that night.

CASE II.—BUBONIC PLAGUE.—RE-ABSORPTION OF BUBO WITHOUT SUPPURATION; RECOVERY.

Gownshanker Mathara, a male Hindoo, aged 25; private servant; admitted March 2nd, 1898. There is a history of two days' illness, the principal symptoms being headache and giddiness, fever and a swelling in the right groin.

State on admission.—The patient is conscious and answers questions rationally; at times there is delirium; there is severe frontal headache and giddiness. The tongue is moist and covered with a thin white fur. The conjunctivæ are injected. There is a very tender bubo, the size of a hen's egg, in the right femoral region. Temperature 100·2°, pulse 96, weak; respirations 28.

Treatment.—Poultices to the bubo; rest, milk diet, four ounces of rum in the twenty-four hours; and the Mist. Quin. cum Strych (*vide* case I). On March 3rd, as the pulse became weaker the following hypodermic injection was given and repeated every 4 hours:—

Liq. Strych. m. V.
Sp. Aetheris. Sulph. m. XV.

Course of the illness.—From the 3rd, improvement was rapid but interrupted. The pulse became slower and stronger. Delirium was at times troublesome, but was easily controlled by sulphonal. As the bubo showed no signs of softening the poultices were stopped. The bubo gradually receded and on the day of discharge there was scarcely any perceptible swelling. The patient left the hospital on March 26th.

CASE III.—BUBONIC PLAGUE.—SECONDARY PNEUMONIA AND PLEURISY; EXHAUSTION AND DEATH ON THE TWENTY-SECOND DAY.

J. F. Sequeira, Christian male, aged 20; admitted to hospital February 24th, 1898, with a history of two days' illness.

State on admission.—Temperature 105°, respirations 38, pulse rapid and weak. The tongue is coated with a thick, white, dry fur on the dorsum, leaving a pink patch of normal mucous membrane at the tip. There is a small tender bubo in the right groin. There is some cough with scanty mucous expectoration. The chest is normal save that medium crepitations accompany inspiration at the left base posteriorly.

Treatment.—Milk diet; four ounces of rum in the twenty-four hours. Poultices to the bubo. The chest was wrapped in cotton-

wool and the following stimulant and expectorant mixture was prescribed :—

℞

Ammon. Carb. grs. V.
Sp. Aetheris Sulph. m. XX.
Liq. Strychniæ m. V.
Sp. Chloroform m. X.
Aquæ Camphoris ad. oz. I.

every four hours.

Later, as the pulse became weak, hypodermic injections of Strychnia and Aether were given every four hours.

Course of the illness.—The bubo rapidly increased in size until it was as large as a turkey's egg; a large and deep slough formed involving the whole depth and breadth of the bubo, and when this separated (on March 12th) a large, deep, irregular cavity was left, which at no time showed much tendency to heal. On March 12th, there was slight hæmoptysis; pain was complained of in the left side and a dry pleuritic rale was heard over the left base in the axilla. The temperature, which had throughout been very irregular, dropping on many occasions to normal and on others rising to 103° or 104°, rose on the 13th to 104·8° and the sputum was for the first time rusty in character. On the 14th the breath sounds on the left side were distant; friction was absent; expiration was prolonged. On the 15th, the pneumonic signs were more pronounced; these were dulness, tubular breathing, and profuse fine and medium crepitations. The pulse was at this time very weak. On the 16th, the patient became delirious; there was profuse rusty sputum; the pulse became extremely weak and in spite of treatment death occurred at 8 p.m.

CASE IV.—BUBONIC PLAGUE.—MULTIPLE SUPPURATING BUBOES; INTER-CURRENT ERYSIPELAS; EXHAUSTION AND DEATH ON THE 30TH DAY.

Joseph A. Dennis, Christian male, aged 25; cook; admitted to Hospital February 21, 1898, with a history of three days' illness.

State on admission.—Temperature 100·6°; pulse 98, intermittent; respirations 30. The tongue is moist and highly coated with greyish-white fur; there is nausea, but no vomiting; the bowels are confined. There is a tender bubo, the size of a walnut, in the left axilla; there is also pain and tenderness in the left neck, but no swelling can be felt there. There is no cough and the chest is normal. The spleen is not enlarged.

Treatment.—Rest ; milk diet. Four ounces of rum in the twenty-four hours.

R./

Ol. Ricin oz. i statim.
Mist. Quin. C. Strychinii oz. i (*vide* case I).
Every four hours.

Course of illness.—On February 24th, a chain of small hard, tender, swollen glands was felt in the right neck, and along the anterior margin of the sterno-mastoid ; and a very similar chain of glands appeared in the left groin. On the same day there was some diarrhœa. There was marked sleeplessness which required sulphonal to control it. Three days later a chain of enlarged, tender glands appeared in the right groin, both above and below Poupart's ligament, and a small tender swelling was first noticed in the right neck. The temperature rose to 103° and from that time until the 10th of March the temperature curve shows a daily rise to a maximum varying between 100° and 103°.

On and after March 11th, the temperature remained normal until the 13th. A large furuncle appeared on the right shin on February 28th, and was opened. The bubo in the left axilla was incised on March 6th, and that in the left groin on March 7th. Both the cervical buboes were opened on March 13th and about one drachm of thick pus was squeezed out of each. The patient became markedly weaker in consequence of the great drain of matter from so many different parts of the body, and he was placed on a regimen of milk and sago conjee, egg-flip, six ounces of rum in the twenty-four hours, and Brand's essence of beef.

On the evening of March 13th, the day on which cervical glands were incised, the temperature rose suddenly to 105°, and there was profuse perspiration with marked prostration and weak pulse. After a dose of Phenacetin, gr. 15, the temperature fell to 98°. Hypodermic injections of Strychnia and Aether were given every four hours. On the 14th a small sub-mental bubo was incised and 3 drachms pus squeezed out. The temperature rose to 102·8° ; nothing could be discovered either in the internal organs, or locally at the site of the incisions, to account for these rises in temperature ; but on the 16th a red blush and a certain amount of brawny swelling had appeared in the left neck, starting from the clavicle and spreading upwards over the cheek. The weakness increased and despite the exhibition of large doses of Tr. Ferri Perchloride (m. 20 every four hours), the erysipelas spread to the right neck and cheek. Constant and profuse perspirations, which were only slightly checked by the liberal exhibition of Belladona, still further exhausted the patient, and he died at 5-30 a.m. on March 20th.

It is of interest to note that in this case the enlarged glands in the right groin completely receded, while all those in other positions (namely, the right and left cervical, the sub-mental, the left axillary and left inguinal) suppurated.

CASE V.—BUBONIC PLAGUE.—MULTIPLE BUBOES; HYPERPYREXIA DIARRHŒA; RECOVERY.

Shivram Vithoba, Hindoo male, aged 22; admitted to hospital March 2nd, 1898, with a history of two days' illness.

State on admission.—Temperature 102·8°, pulse 130, very feeble; respirations 40. There is a small, hard, tender bubo in the left axilla, and a small patch of necrosed skin on the anterior surface of the left forearm. Between the left little and ring fingers is a small furuncle. The tongue is moist and slightly furred. The bowels are regular. There is no cough. The spleen is not enlarged. The mental state is clear. At midnight the temperature rose to 105° and the patient became delirious and restless.

Treatment.—Rest; milk diet. Three ounces of rum in the twenty-four hours. Poultices to the bubo.

℞/ Mixt. Quinine cum Strychnia oz. I, every 4 hours.

and for the hyperpyrexia:

℞/ Phenacetin gr. XV, statim.

Course of the illness.—The bubo in the left axilla slowly receded. On March 8th a small tender bubo appeared in the left groin. On March 10th a similar bubo appeared in the right axilla, and on the 11th a fourth bubo was noted in the right neck, below the ear. The bubo in the left groin was incised on the 13th and discharged freely.

Those in the axillæ and neck receded without suppuration. On the 23rd the bubo in the left axilla, which had nearly disappeared, became larger and painful but it again receded without suppuration. On the 24th a very tender swelling of the left supra-trochlear gland appeared and rapidly suppurated, and was opened on the 25th. In the meantime the temperature had been constantly high, on two or three occasions rising above 104°, but on the whole showing a tendency to become lower. Exceedingly troublesome diarrhœa set in on March 4th and lasted with intermissions until the 10th. Between the 4th and the 15th the patient was extremely weak, and the prognosis at this time seemed almost hopeless. He was placed on special diet, with egg-flip and an increased quantity of rum, and Strychnia and Aether was injected

hypodermically every 4 hours. Improvement was slow but steady. The buboes which had been opened gradually healed and the others completely receded. The patient is now (April 7th), with the exception of some remaining weakness, quite convalescent, and will shortly be discharged.

CASE VI.—BUBONIC PLAGUE.—LATE APPEARANCE OF PRIMARY BUBO (ON THE 8TH DAY); BRONCHITIS; DEATH ON THE 9TH DAY.

Philip Fernandez, Christian male, aged 46; a butler; admitted to hospital March 15th, 1898, with a history of three days' illness.

State on admission.—Temperature 99·8°, pulse 102, fairly strong; respirations 24. The tongue is thickly coated with grayish-white fur, and dry. There is slight frontal headache and some giddiness. There is some cough, most troublesome at night; the expectoration is scanty and muco-purulent. The bowels are confined. No bubo can be discovered. There are sibilant ronchi on both lungs, otherwise the chest is normal.

Treatment.—The patient was put in an observation ward, the chest was wrapped in cotton wool; he was ordered milk diet and the following tonic and expectorant mixture:—

Ammon. Park. gr. V.
Vin. Ipecac. m. V.
Sp. Cloroformi. m. V.
Liq. Strychninæ m. IV, oz. 1.
Aqua. Camph. ad. oz. I.
Every 4 hours.

Course of the illness.—The bronchitic symptoms showed little signs of cleaning, and the patient became gradually weaker. On March 20th, 5 days after admission and on the 8th day of the illness, a small hard tender bubo appeared under the chin. The weakness increased, the bronchitic symptoms became more marked, loud crepitations, indication of hypostatic conjestion appeared at both bases behind, and the patient died of exhaustion at 11-45 a.m., on the 21st of March.

SIX CASES REPORTED BY DR. ALICE CORTHORN.

CASE I.—S. G., HINDU FEMALE, AET: 12; ADMITTED 12th MARCH 1898 AT 6 A.M., CONVULSIVE TYPE; DEATH.

History.—Rigors, followed by five days' fever, attended for two days with diarrhœa and vomiting, some cough, and a tender painful bubo in the right groin.

Condition on admission.—Temperature 100, pulse 87 per minute, and respiration 32: dry hot skin, moist furred tongue, headache and great prostration.

Course.—Prostration increased and diarrhœa continued. She fell out of bed apparently in a fit, for, when seen soon after, she was unconscious, with upturned eyes, shallow and rapid respiration, thready pulse, and convulsive movements of upper limbs. There was also a huge purple hæmatoma on the forehead. Consciousness never returned, and at 3-15 p.m. she was lying with lower limbs stretched out, pupils dilated, and inactive to light, arms flexed and stiff, teeth clenched and body opisthotonous. After two minutes the muscles relaxed and urine was passed. Three fits followed with gradually diminishing intensity, death occurring at 3-45 p.m.

Treatment.—Chalk mixture had been given for the diarrhœa and rum for the prostration and one dose of a mixture containing Quinine and three minims of Liquor Strychniæ.

CASE II.—SECONDARY PNEUMONIA; DEATH.

R. K., Hindu female, aet. 19; admitted 14th March 1898 (afternoon).

History.—Rigors and fever of one day's duration.

Condition on admission.—Temperature 105, pulse 120 (fairly strong and regular), respiration 37; drowsiness, constipation, thickly furred tongue, and diffuse tender swelling in the left groin above Poupart's ligament.

Course.—Constipation continued, slept well with intervals of excitement and delirium, pyrexia continued, pulse became weaker, tongue somewhat clearer, drowsiness diminished, bubo extended to femoral glands, sudden supervention on 19th March 1898 of acute pneumonia followed by death on 20th March 1898 at 3-5 p.m.

Treatment.—Hypodermic injections of three minim doses of Liq. Strych. every four hours, and a mixture containing Tinct. Nucis Vomic., Spirit Aether, Spirit Ammon., and rum. Constipation was relieved by Calomel and enemata, and delirium by Pot. Brom. and Caffeine Citrat.

CASE III.—SUPPURATION OF BUBO; RECOVERY.

M. V., Hindu female, aet. 20; admitted 4th March 1898.

History.—Fever of two days' duration.

Condition on Admission.—Temperature 105, pulse 100 (fairly full and regular), skin hot and dry, and tongue thickly furred.

Course.—Pyrexia continued high for two days and then was brought down by Phenacetin. The tongue remained thickly coated and the ocular conjunctivæ injected; speech was indistinct and on 5th March

1898 a small bubo appeared in the right groin, which became painful and tender on the following day, accompanied by diffuse infiltration. Till the 10th instant the temperature ranged between 99 and 103, and after that remained practically normal. The general condition of the patient remained fairly satisfactory throughout. Fluctuation was detected in the bubo on the 16th; it was incised on the 17th; discharge ceased on the 20th, and the wound had healed on the 24th, the patient being declared convalescent.

Treatment.—Phenacetin for pyrexia; poulticing the bubo, followed by Carbolic compress and incision; tonic mixture containing Quinine and Strychnine.

CASE IV.—RECOVERY; RESOLUTION OF BUBO WITHOUT SUPPURATION.

I. G., Eurasian female, aet. 16; admitted morning of 27th February 1898.

History.—Frontal headache, on 25th February 1898 and 26th February 1898, persistent vomiting, pain in right groin on 26th February 1898 with high temperature 105°. Dead rats had been found in patient's room 8 days previously.

Condition on admission.—Temperature 103, pulse 126 (feeble), tongue furred and moist, tenderness, but no swelling in right femoral region, slight cough, and skin moist.

Course.—Vomiting persistent for two days (controlled by ice and Sinapisim Epigastrium). Delirium and insomnia marked on 1st March 1898. Pyrexia continued for ten days, fluctuating between 100 and 104, and once reaching 105. Temperature was normal on 13th March 1898. On 2nd March 1898 there was retention of urine for 24 hours, necessitating passage of a catheter once. Bowels constipated up to 6th March 1898 followed by diarrhœa; fulness over the tender region followed soon after admission and developed into a bubo which began to subside on 13th March 1898; poulticing caused a blister over the bubo resulting in an indolent ulcer; convalescence was steady and the patient was discharged cured on 22nd March 1898.

Treatment.—Poulticing to bubo; dressing to ulcer; Calomel and Castor Oil for constipation; Sulphonal for insomnia; Phenacetin and Diaphoretics for fever; Rum for prostration, with Ammonia, Ether and Liquor Strychniæ; tonic mixture containing Quinine and Strychnia during convalescence.

CASE V.—MULTIPLE BUBOES; DEATH.

P. D., Hindu female, aet. 25 (ayah on duty in Hospital).

History.—Fever on 11th March 1898 with headache, vomiting, restlessness, pain in calves of legs, and bubo in right axilla.

Condition on admission.—Temperature 101·4, pulse 98, respiration 30, tongue furred, eyes injected, thick speech, drowsiness, only partial consciousness, and bubo under border of right pectoralis major.

Course.—Temperature on 12th March 1898, 101, pulse 98, respiration 30, tongue furred, eyes injected, and on 13th March 1898, temperature fell to 97 at 6 a.m., with cold surface and extremities; on 14th March 1898 temperature rose to 101, surface still cold, bowels much relaxed, speech more indistinct. On 15th March 1898 a bubo appeared in the right posterior triangle of the neck; on 16th March 1898 the temperature rose to 103° surface still cold, low muttering delirium, feeble thready pulse, respiration hurried and shallow. A third bubo appeared under the chin and on 17th March 1898 she became much worse, and one bubo appeared in each groin. She gradually sank and died at noon of that day.

Treatment.—During first 36 hours she received 2 drachms a day, in four-hourly doses, of Liquor Ferri Perchlor. On the first day diaphoretics with Rum, Quinine and Strychnine, but after the second day these were omitted, and a stimulant mixture containing Tinct. Nuc. Vomic., Spirit Aether and Ammonia was substituted.

CASE VI.—MILD FORM OF PLAGUE, COMPLICATED WITH GREAT MENTAL EXCITEMENT DURING PERIOD OF ABATEMENT OF OTHER SYMPTOMS, RESOLUTION OF BUBO WITH SUPPURATION.

O. R., Hindu female, aet. 40; admitted 2nd March 1898; fever and swelling in the left groin having come on the same day.

Condition on admission.—Temperature 102°, pulse 120, respiration 30; tongue thickly furred; left femoral bubo; constipation and headache.

Course.—She progressed favourably, the temperature falling to normal on 7th March 1898 and the tongue cleaning up. On the forenoon of the 7th she became maniacal, violent, and unmanageable, and had to be quieted by Morphia. On the following day she had the same symptoms but less marked, and the condition remained much the same with delusions until the 12th, when she became quite quiet and rational, and from this date she commenced to convalesce, the bubo getting gradually smaller. On 23rd March 1898 she was discharged cured.

Treatment.—Castor oil for the constipation; Quinine, Strychnine, Rum in a mixture, Bromide and Morphia for the excitement, and poulticing for the bubo.

ARTHUR ROAD HOSPITAL.

Statistical and Clinical Record of Work from July 1st, 1897, to March 31st, 1898.

(By Dr. N. H. Choksey.)

MEDICAL OFFICERS:

Dr. N. H. Choksey, Chief Medical Officer.
„ F. H. Pearse.
„ D. S. Fraser.
Dr. Treasurywalla.
„ P. R. Pilgonka.

This Municipal Hospital has remained open continuously since the date of the last report in June 1897, for the reception of all infectious diseases. In addition to Plague cases, there have been admitted persons suffering from two other diseases, cholera and relapsing fever, which have been epidemic during the period under report.

Some idea of the magnitude of the work can be obtained when it is stated that the total number of patients admitted during the nine months covered by this report was 4,121. The total accommodation has been increased from 150 beds in June 1897, to 500 beds.

On the first of July 1897, there remained in hospital 41 patients, and there were admitted during the period covering the report 4,121, making the grand total of 4,162 patients.

The admissions were distributed amongst the following diseases:—

Plague	1,917
Relapsing Fever	929
Cholera	225
Small-Pox	39
Chicken-Pox	52
Measles	24
Mumps	2
Whooping Cough	4
Observation	929
Total,.. ...	4,121

The maximum number of patients in hospital on any single day was 350. The Plague maximum was 200, that of relapsing fever 120, and of observation cases 50.

The following table shows the admissions from the various diseases, by months, from July to March :—

Names of Months.	Plague.	Relapsing Fever.	Cholera.	Small-Pox.	Chicken-Pox.	Measles.	Mumps.	Whooping Cough.	Observation.	Total of each Month.
1897.										
July	13	15	111	10	...	...	...	...	73	222
August	11	24	73	4	...	...	...	...	74	186
September	33	54	26	...	1	...	...	...	128	242
October	31	57	8	4	...	1	...	...	140	241
November	52	82	8	2	...	1	...	...	146	286
December	167	190	2	1	4	10	2	4	166	546
1898.										
January	496	188	1	2	6	5	...	...	112	810
February	660	218	...	2	13	4	...	...	61	958
March	454	101	1	14	28	8	...	...	29	630
Total ...	1,917	929	225	39	52	24	2	4	929	4,121

Plague and Relapsing Fever.

It will be seen from the above table that although Plague had considerably lessened in Bombay, it had not become quite extinct, and that during the months of July, August, September and October three epidemic diseases—Plague, relapsing fever and cholera—were running concurrently. Cholera, however, almost vanished in early October, but Plague and relapsing fever went on gathering strength and virulence as they advanced. It is indeed strange that two such dissimilar diseases, Plague and relapsing fever, should run together, attain their maximum, and decline also just about the same time, though not in equal proportion. For whereas relapsing fever has all but disappeared by the middle of April, Plague still continues to claim its victims weekly by hundreds. Both diseases present this peculiarity that they are infectious; but it is an undoubted fact that relapsing fever is highly infectious and certainly more so than Plague. But here the similarity ends. As against a normal Plague mortality of about 74 per cent., the mortality from relapsing fever is 18·51 per cent. Another curious feature that was observed during the second Plague epidemic was the blending or mixing of the poison of relapsing fever and Plague in the same patients, sometimes the one intensifying the other, at others moderating its severity. And what was still more striking in this dual infection was the fact that it existed mostly in the weak and the under-fed, the same class of patients that have shown themselves to be the most susceptible to both infections. When Plague has prevailed extensively amongst the better classes inhabiting this city, the curious feature of the mixture of Plague and relapsing fever was observed only amongst the lower.

The total number of Plague admissions during the period was 1,917. The epidemic, which might fairly be considered to have begun in September, rose gradually not unlike the previous one up to December, and then there was a sudden and virulent exacerbation to an extent which was scarcely to be compared indeed to the epidemic of 1896-97, but for which we were not unprepared, looking to the similar experience of Poona. With the increase of the virulence of the epidemic, the number of admissions also considerably increased, these being 496 in January, 660 in February, and 454 in March. As contrasted with the admissions during the same months in 1897, they were nearly double. That the cases were more virulent and malignant than in 1896-97 can scarcely be doubted and the mortality at times was simply appalling. It has happened that deaths from Plague at this Hospital have numbered as many as 35 in 24 hours. The largest number of cases admitted on any day was 48. The virulence of the infection was shown by the rapidity with which death supervened before the symptoms had become fully developed, and even before buboes made their appearance.

Some cases of very severe hæmorrhage were observed for the first time during this epidemic, the patients generally bleeding to death from hæmorrhage of the stomach.

The virulence of this epidemic, which made itself manifest towards the beginning of January, gradually increased in intensity until a maximum was reached towards the middle of February. For five days thereafter, the cases appeared to be somewhat less virulent, but in about a week's time they reverted to the former type and adhered to it till nearly the third week in March. The period of the greatest mortality was from the first week in January to the middle of February, when the mortality rose to between 85 and 90 per cent., and were it not for the temporary improvements above referred to, the mortality for February would have stood still higher.

Three locally-trained Nurses developed symptoms of Plague, but fortunately the cases turned out to be those of, *pestis ambulans*. The late Miss MacDougall contracted Plague in the discharge of her duties, and her sad untimely death was the source of intense grief to the Medical Officers, as she was a most zealous, energetic and painstaking nurse and did not spare herself in the discharge of her duties.

Three ward-boys contracted Plague; two of them died and one recovered.

The conduct of the establishment has been exemplary. All have worked with praiseworthy zeal during the trying time of the epidemic.

The subjoined table A gives the particulars of admissions together with death-rate, &c., from July to the end of March. It appears that of the 1,917 admissions from Plague, 1,410 died and 507 recovered, giving a death-rate of 73·55 per cent. Of the 1,410 deaths, 531 occurred within 24 hours, and 387 within 48 hours, so that nearly 50 per cent. of the total admissions died within 48 hours of admission. Most of the former deaths occurred within 12 hours of admission, and a considerable number of these within a period varying from a few minutes to 3 or 4 hours. Omitting the deaths within 24 hours the mortality rate stands at 68·41 per cent.

TABLE A.

Months.	No. of Cases.	Died within 24 Hours.	Died within 48 Hours.	Total Deaths.	Recovered.	Mortality per cent.	Percentage of Mortality, excluding Deaths within 24 Hours.
1897.							
July ...	13	1	1	7	6	53·84	50·00
August ...	11	3	...	7	4	63·63	50·00
September ...	33	11	4	22	11	66·66	50·00
October ...	31	6	7	16	15	51·61	40·00
November ...	52	11	6	26	26	50·00	36·58
December ...	167	32	44	115	52	68·86	61·48
1898.							
January ...	496	189	103	362	134	72·98	62·46
February ...	660	185	140	514	146	77·87	69·24
March ...	454	143	82	341	113	75·11	63·66
Total...	1,917	531	387	1,410	507	73·55	63·41

Table B which follows, in part reproduces Table A. It gives the total statistics for this Hospital from September 1896 to March, 1898. The bracketed months at the top and bottom of the list are six corresponding months in the rise of each epidemic (the second epidemic was a month later in the year than the first one), and an interesting similarity in the course of *virulence* of both epidemics, as measured by death-rate, is disclosed.

TABLE B.

Months.	Cases.	Died within 24 Hours.	Died within 48 Hours.	Total Deaths.	Recovered.	Total Mortality per cent.	Mortality per cent. excluding Deaths within 24 hours.
1896.							
September }	88	17	10	46	42	52·23	40·84
October }							
November ...	27	9	3	18	9	66·67	50·00
December ...	182	60	63	135	47	74·12	61·47
1897.							
January ...	277	90	43	191	86	69·00	54·00
February ...	365	130	46	298	67	81·64	71·48
March ...	193	54	34	130	63	67·35	54·28
April ...	60	17	10	34	26	56·66	39·53
May ...	26	7	1	10	16	38·46	15·78
June ...	42	2	1	6	36	14·28	10·00
July ...	13	1	1	7	6	53·84	50·00
August ...	11	3	.....	7	4	63·63	50·00
September ...	33	11	4	22	11	66·66	50·50
October ...	31	6	7	16	15	51·61	40·00
November ...	52	11	6	26	36	50·00	36·58
December ...	167	32	44	115	52	68·86	61·48
1898.							
January ...	496	139	103	362	134	72·98	62·46
February ...	660	185	140	514	146	77·87	69·24
March ...	454	148	82	341	113	75·11	63·66
Grand Total..	3,177	917	598	2,278	899	71·70	60·22

The following six tables give the details of the castes and sexes, and their respective mortalities.

No. I.

	No.	Died.	Recovered.	Percentage of Mortality.
Hindus	1,711	1,280	431	74·81
Musalmans	71	50	21	70·42
Christians	111	70	41	63·60
Jews or Beni-Israels	12	8	4	66·66
Parsis	12	2	10	16·66
Total ...	1,917	1,410	507	73·55

No. II.—Hindus.

	No.	Died.	Recovered.	Percentage of Mortality.
Males	1,192	896	296	75·16
Females	401	297	104	74·06
Children	118	87	31	73·72
Total ...	1,711	1,280	431	74·81

No. III.—Musalmans.

	No.	Died.	Recovered.	Percentage of Mortality.
Males	56	37	19	67·85
Females	13	12	1	92·30
Children	2	1	1	50·00
Total ...	71	50	21	70·42

No. IV.—Christians.

	No.	Died.	Recovered.	Percentage of Mortality.
Males	75	48	27	64·00
Females	23	12	11	52·17
Children	13	10	3	76·92
Total ...	111	70	41	63·60

No. V.—Jews—Beni-Israels.

	No.	Died.	Recovered.	Percentage of Mortality.
Males	5	3	2	60·00
Females	2	2	...	100·00
Children	5	3	2	60·00
Total ...	12	8	4	66·66

No. VI.—Parsi.

	No.	Died.	Recovered.	Percentage of Mortality.
Males	8	1	7	12·50
Females	3	1	2	33·33
Children	1	...	1	00·00
Total ...	12	2	10	16·66

GRANT ROAD HOSPITAL.

STATISTICAL AND CLINICAL REPORT OF WORK FROM JULY 1897 TO MARCH 31ST, 1898.

By DR. L. T. R. HUTCHINSON, M.A., M.B., B.C. (CAMB.).

This Hospital was re-opened on July 29th, 1897, and up to March 31st, 1898, 2,102 patients were admitted, of whom 988 recovered, 1,090 died, and 24 remain under treatment.

STATISTICS.

Total cases admitted	... 2,102	General mortality 51·85.
„ „ discharged	... 988	
„ „ died	... 1,090	
„ „ remaining	... 24	

Excluding all cases suffering from diseases other than Plague, the returns are as follows :—

Plague cases admitted	... 1,201	Plague mortality 79·26.
„ „ discharged	... 229	
„ „ died	... 952	
„ „ remaining	... 20	

From July 20th to December 31st, the Hospital was under the charge of the following Medical Officers :—

From July 29th to September 8th, Dr. A. McCabe Dallas, L.M., L.R.C.P. (Dublin).

From September 9th to October 9th, Surgeon-Captain Gallaghar.

From October 10th to December 31st, Dr. V. Roberts, L.M. & S.

The present Medical Officer, Dr. Hutchinson, took charge on January 1st, 1898.

General statistics only are available of the work done during the period from July 29th to December 31st, 1897, and all detailed statistics and notes on the clinical work of the Hospital refer to January, February, and March 1898, when the second epidemic was at its height.

The Hospital is situated in the centre of several districts which were the earliest and most severely affected. Previous to the opening of the Private Hospitals, Marathas and Hindus formed the greater part of the admissions. From the middle of January the admissions were mainly from amongst the low-caste Hindus. There is accommodation for 138 patients ; three out of four wards are "pucca" and afford free light and ventilation. Relations of patients were admitted at any time during the day, only two being allowed to visit each patient at a time. At night only relations of patients who were dangerously ill were admitted.

It was found impossible to prevent them from handling the patients; yet, notwithstanding their constant and close contact, the occurrence of only two cases of Plague amongst the relations was brought to notice.

Amongst the Hospital Staff there were five deaths from Plague. In the case of one ayah and one ward-boy, the form was that of Primary Pneumonic Plague. The other three a dresser, a cook, and a '*mali*' were cases of Bubonic Plague. Little can be added to what has already been written as regards the clinical aspect of the disease. For the purpose of statistics, three main types have been recognised :—

I. Bubonic Plague.
II. Primary Pneumonic Plague.
III. Plague Septicæmia.

The Bubonic type was the most frequent. A comparatively rare and very fatal form was noticed in forty cases, in which there was very extensive brawny induration around the bubo; this occurred most frequently in the case of axillary and parotid buboes, and occasionally took the form of a diffuse cellulitis, spreading rapidly downward over the thorax and upwards around the shoulder and to the cervical region. In the case of parotid buboes the induration was almost always of an extremely firm brawny character. No pus could be obtained, and incisions though deep resulted in remarkably slight bleeding, the tissue having a dense fibrous appearance.

The Pneumonic type of Plague is of great interest, and special importance attaches to the differential diagnosis between the primary and secondary forms, inasmuch as primary pneumonia is almost invariably fatal, while recovery from the secondary form is by no means rare. Out of eighty-eight cases of primary plague pneumonia admitted, only one case recovered. In a typical case the usual Plague symptoms are well marked and characteristic; from an early stage, respiration is greatly accelerated and laboured, and in the majority of cases the sputum assumes a diagnostic appearance; generally scanty but sometimes abundant, it is white, frothy, and contains either minute dots or streaks of bright red blood; occasionally the blood is more intimately mixed with the sputum, but the usual rusty sputum is absent. Ronchi and mucous '*râles*' are general with localised patches of dullness and a few fine crepitations, but more often the case proves fatal before physical signs develop. The sputum is on examination found to be almost a pure culture of Plague bacilli and is doubtless intensely infectious. The sputum was in a large number of cases examined microscopically, and in one case a

typical Plague culture on agar was obtained. Unfortunately the heavy pressure of work precluded extended investigation. The above group of symptoms were however present in a series of cases which undoubtedly formed a separate type of the disease, quite distinct from the cases of secondary pneumonia which were of comparatively frequent occurrence and of a much less virulent character.

The third group of cases has been named Plague Septicæmia. These represent the most virulent type of all, death invariably occurring before any localised symptoms, buboes or pneumonia, have time to develop. The general symptoms are intensely marked.

Eleven cases were admitted in which there was direct evidence of infection by local inoculation, a characteristic lesion resulting. Seen in the early stage these had the appearance of a dirty greyish-black blister with a raised, red, indurated margin. The inflamation and induration rapidly extend; the contents of the blister being dark in colour and foul smelling. In one case the lymphatics leading to the corresponding set of glands were most distinctly mapped out in red inflamed streaks. There is nothing new to note in reference to treatment. The local treatment of the buboes with ice-bags when seen early and before the development of much induration was found most successful. No advantage could be found in the use of alcoholic stimulants in the earlier stage of the disease.

Treatment by inoculation with curative serum prepared in St.Petersburgh according to Dr. Yersin's method was tried by Dr. A. DeWigora of the Russian Medical Mission for the investigation of Plague. Forty cases in all were inoculated, a certain selection of cases being made. Preference was given to cases admitted about the 2nd or 3rd day of the disease, and all cases evidently moribund were excluded. Buboes were present in all but 4 of the cases. At first 10 cc. were injected subcutaneously twice daily at intervals of 12 hours. Subsequently 20 cc. and occasionally 30 cc. were given each time. Of the 40 cases inoculated, thirty-two died and eight recovered, giving a death-rate of 80 per cent. This mortality was the same as that of the cases not subjected to the treatment, at the time when the experiments were made. Dr. DeWigora is of opinion that the serum often effected a slight reduction of temperature immediately after injection, though this was by no means always so. No effect was noted on pulse or respiration and Dr. DeWigora finally concludes that the serum has no effect on the course of the disease, and as a cure for Plague is an

indifferent remedy. No ill-results were at any time noted consequent on inoculation.

The following tables analyse in various ways the 854 Plague cases and 706 deaths which were registered at this Hospital between January 1st and March 31st, 1898.

Admissions.

	No.
Sent in by house-searching parties ...	562
Voluntary admissions	224
Admitted from Segregation Camps ...	37
„ „ Railway Stations ...	2
Found on the Road side	39
Total...	854

Of the above 224 voluntary admissions, 138 were males and 86 females.

No cases were sent in from harbour inspection.

The occupations of the patients admitted were as follows :—

Ayahs	3
Beggars	18
Barbers	13
Blacksmiths	5
Cart drivers	14
Carpenters	16
Coolies	133
Cooks	18
Clerks	7
Domestic servants	59
Dhobies	9
Gardeners	6
Goldsmiths	7
Grooms	8
Hamals	13
Hawkers	12
Mill-hands	43
Milkmen	3
Labourers	37
Shoemakers	19
Syces	6
Tailors	21
Various	90
No occupation	294
Total...	854

The position of the buboes, with the death-rate in each type of the disease, is given in the following table :—

POSITION OF BUBO.		Males.			Females.			Total.		
		Cases.	Deaths.	Remainder.	Cases.	Deaths.	Remainder.	Cases.	Deaths.	Mortality per cent.
Cervical	R.	29	27	2	17	13	14	79	67	84·81
	L.	28	19	4	10	8	2			
Parotid	R.	4	3	1	1	+	—	7	6	85·71
	L.	—	—	—	2	2	—			
Submaxillary	L.	2	1	1	2	2	—	4	3	75·00
Axillary	R.	49	39	10	25	21	4	150	128	85·3
	L.	42	39	3	34	29	5			
Inguinal	R.	117	100	17	46	36	10	300	275	91·66
	L.	88	78	10	49	41	9			
Femoral	R.	3	2	1	—	—	—	9	8	88·68
	L.	4	4	0	2	2	—			
Iliac	R.	1	1	0	—	—	—	1	1	100·00
Poplitcal	R.	—	—	—	1	—	1	1	—	Nil.
Submaxillary	R.	2	1	1	2	2	—	4	3	75·00
Supertrochlear	L.	1	0	1	...	...	...	1	—	Nil.
Sublingual		1	1	—	1	1	—	2	2	100·00
Multiple		75	64	11	38	33	5	113	97	85·84
Pneumonic Plague		57	56	1	31	31	0	88	87	98·86
Plague Septicæmia		31	31	0	8	8	0	39	39	100·00

* *Analysis of the* 113 *cases in which multiple buboes were affected, shewing the position of the buboes :—*

Position of Buboes.	Cases.	Deaths.
R. + L. Cerv.	12	11
R. + L. Ax.	2	2
R. + L. Ing.	18	14
R. Ing. + R. Cerv.	2	2
R. Ing. + R. Iliac	8	8
R. Ing. + R. Ax.	7	5
R. Ing. + L. Ax.	2	2
R. Ing. + R. Femoral	1	1
R. Ing. + R. Parotid	1	1
L. Ing. + L. Parotid	1	1
L. Ing. + L. Femoral	1	1
L. Ing. + L. Iliac	18	17
L. Ing. + L. Ax.	3	3
L. Ing. + R. Ax.	3	3
L. Ing. + L. Cerv.	3	1
R. + L. Femoral	1	1
R. Cerv. + R. Ax.	3	2
L. Cerv. + R. Ax.	4	3
R. Cerv. + L. Ax.	1	1
R. + L. Cerv. + R. + L. Ax.	1	1
R. + L. Cerv. + L. Ax.	1	1
R. + L. Cerv. + L. Parotid	1	1
R. + L. Cerv. + R. + L. Ing.	1	.....
R. + L. Cerv. + Sublingual	2	2
R. Cerv. + R. Ax. + R. Ing.	1	1
R. Cerv. + R. Submaxillary + L. Ax. + L. Supratrochlear	1	1
R. + L. Cerv. + Poplitcal + R. Supratrochlear	1	1
R. Ing. + L. Supratrochlear + L. Ax.	1	.....
R. Cerv. + R. Ax. + L. Submaxillary + L. Sublingual	1	1
R. + L. Ax. + L. Parotid + L. Ing.	1	.....
R. + L. Ing. + R. Ax. + R. Cerv.	3	2
R. Parotid + R. Sublingual	1	1
L. Ing. + Iliac + Femoral	1	1
R. Ing. + Iliac + Femoral	1	1
R. + L. Ing. + Femoral	1	1
R. + L. Femoral + L. Ing. + R. Submaxillary	1	1
L. Submaxillary + Sublingual	1	1
R. + L. Cerv. + R. Ax.	1	1
Total	113	97

The following table shews the mortality in relation to caste :—

Caste.	Males.		Females.		Total.		
	Cases	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Mortality per cent.
Brahmin	22	19	5	4	27	23	85·18
Eurasian	1	1	...	...	1	1	100·00
Gujeratti	14	11	2	2	16	13	81·25
Mahratha	273	223	131	105	404	328	81·18
Mohammedan	13	10	7	5	20	15	75·00
Native Christian	31	27	8	7	39	34	87·17
Purdesi	41	30	9	8	50	38	76·00
Surtee	17	15	1	1	18	16	88·88
Telegu	7	5	6	4	13	9	69·23
Unknown	2	2	1	1	3	3	100·00
Hindoos—low-caste	159	140	104	86	263	226	85·93
Total	...	...	...	..	854	706	82·66

The incidence of mortality in relation to age and sex is shewn in the following table :—

Age.	Males.		Females.		Total.		
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Mortality per cent.
Under 1 year	1	1	...	...	1	1	100·00
1 to 5 years	11	7	11	8	22	15	68·18
5 to 10 „	45	33	40	38	84	71	83·52
10 to 15 „	39	28	25	21	65	49	76·56
15 to 20 „	79	71	40	34	119	105	86·55
20 to 25 „	115	92	46	37	161	129	80·12
25 to 30 „	114	91	26	21	140	112	80·00
30 to 40 „	106	97	48	40	154	137	90·25
40 to 50 „	51	44	23	18	74	62	83·78
50 to 60 „	12	12	8	6	20	18	90·00
60 to 70 „	6	4	4	1	10	5	50·00
Over 70 „	1	...	3	2	4	2	50·00
Total ...	...	...	...	...	854	706	82·66

The following table gives the duration of illness in 706 fatal cases :—

Brought in Dead.	Deaths occurring within															
	1 Hour.	3 Hours.	6 Hours.	12 Hours.	24 Hours.	36 Hours.	48 Hours.	3 Days.	4 Days.	5 Days.	6 Days.	7 Days.	8 Days.	9 Days.	10 Days.	Over 10 Days.
23 ...	15	39	33	69	112	78	96	78	52	36	25	15	10	3	6	16
	Deaths within 48 hours = 465							Total Deaths ... 706								

The death-rate per cent. for the period January 1st to March 31st is thus seen to be 82·66. If, however, the cases that died within 48 hours be omitted as moribund on admission, the mortality is 61·95.

Mody Khana Hospital.

Medical Officer.—Dr. A. M. Page.

This hospital was opened in connection with a large segregation camp on January 8th, 1898. In February the hospital was burned down and had to be rebuilt. During the period under report, three successive Medical Officers (R.N.) were in charge—Dr. Julius, Dr. Bernard, and Dr. Page, who took over charge on April 8th.

Cases admitted	875	
„ discharged	272	General mortality, 68·11
„ died	596	
„ remaining	7	

Of the above, 123 were not suffering from Plague. The following is the summary of Plague cases treated :—

Plague cases admitted	...	... 752	Plague mortality, 76·86.
„ „ discharged	...	... 167	
„ „ died ...	...	... 578	
„ „ remaining	...	... 7	

The following table shows the position of the Buboes :—

Position of Bubo.	Males.			Females.		
	Cases.	Discharged.	Died.	Cases.	Discharged.	Died.
Cervical	31	5	26	21	3	18
Parotid	8	...	8	5	...	5
Axillary	68	12	56	40	8	32
Inguinal	127	44	83	53	22	31
Femoral	128	25	103	41	12	29
Supratrochlear ...	...	...	...	3	1	2
Multiple	6	2	4	4	2	2
Pneumonic	95	13	82	48	7	41
Plague Septicæmia ...	28	7	21	18	7	11
Total...	491	108	383	233	62	171

Narielwadi Hospital.

Medical Officer—Dr. Thomas.

This hospital was opened in connection with the Narielwadi Segregation Camp on February 16th, 1898. During the first few weeks 54 convalescent patients were admitted from Mody Khana Hospital. On March 26th a special ward was reserved for the accommodation of Goanese Native-Christians. Four patients were admitted who had been inoculated with Prof. Haffkine's prophylactic serum, of whom three died and one was discharged cured.

Owing to the frequent changes of Medical Officers no detailed report is available; it is probably due to the same reason, that the hospital register was so much neglected that no trustworthy statistics or other information regarding the cases can be obtained.

Cases admitted	423	General mortality, 52·82.	
„ died	215		
„ discharged	171		
„ transferred	4		
„ no record	12		
„ remaining	21		

Plague Cases.

Plague cases admitted	278	Plague mortality, 77·69.	
„ „ discharged	216		
„ „ died	62		

Police Hospital, Foras Road.

Medical Officer—Dr. Sidney Smith.

This hospital was opened in January, as no provision could be made for isolating plague cases at the Mazagon Police Hospital.

Cases admitted	45	General mortality, 60 per cent.
„ discharged	14	
„ died	27	
„ transferred	2	
„ remaining	2	

Adamjee Peerbhoy's Hospital.

PRIVATE HOSPITAL No. 1.

Committee.

Mr. Adamjee Peerbhoy, J.P., President.
„ Mahomedally Adamji, J.P.
„ Abdul H. A. Peerbhoy, J.P., Secretary.
Hakim M. Dayan, J.P.

Medical Officers.

Dr. Khote, B.A., L.M.&S.
Hakim Mulla Abdulali.
Dr. Miss Lina Brale.

This hospital, equipped at the sole expense of Mr. Adamjee Peerbhoy, for the use of the Borah community, was re-opened on August 18th, 1897. The building is in a capital position in the Queen's Road, facing Back Bay, and is admirably adapted for use as a hospital.

The returns of this hospital from August 18th, 1897, to March 31st, 1898, shew the following figures :—

Cases admitted	222	General mortality, 58·10 per cent.
„ discharged	80	
„ died	129	
„ remaining	13	

Of these it is stated that 15 were not cases of Plague. The actual Plague mortality is therefore 62·31 per cent. Of the 129 deaths, 29 occurred within 24 hours of admission, and 18 occurred within 48 hours of admission.

But on the other hand, it may be noted that of 109 patients admitted on the day after seizure, 42 recovered, and of 45 admitted on the second and third day after seizure, 16 recovered; that is, 58 out of 71 patients admitted within three days of attack, recovered. Hence obviously many more than 15 of the admissions were other than Plague cases, and the Plague mortality must be estimated as being considerably higher than 62.

The following are particulars of 180 of the patients above enumerated :—

Occupation.		Age.			
Merchants	13	0	under	1	year.
Servants	15	8	1 to	5	years.
Shopkeepers	17	9	5 „	10	„
Manufacturers	1	36	10 „	15	„
Cooks	5	35	15 „	20	„
Tailors	5	44	20 „	30	„
Khocawallas	2	24	30 „	40	„
Traders	1	13	40 „	50	„
Woodcutters	1	3	50 „	60	„
Firemen	2	2	60 „	70	„
Chikoor	1	6	70 „	80	„
No Occupation...	121				
	180	180			

Bene-Israel Hospital.

PRIVATE HOSPITAL No. 2.

Mr. Cudkher, Chairman.
Mr. David Solomon, Secretary.
Mr. Elijah Solomon, Treasurer.

Medical Officers.

Dr. E. R. Jeyker.
Dr. Daniel Benjamin.

This hospital, situated in Connaught Road, Byculla, was opened on February 23rd, 1898. The arrangements and managements are excellent.

Cases admitted...	13	General mortality, 38·46 per cent.
„ discharged	3	
„ died	5	
„ remaining	5	

Of these 13 cases, 3 cases with 1 death were not Plague. The Plague mortality accordingly is 40·00 per cent.

Bhatia Plague Hospital.

PRIVATE HOSPITAL No. 3.

Govindjee Thakersey Mooljee, Esq., J.P.
Mowjee Shamjee Ludha, Esq., J.P.

Medical Officers.

Dr. Purshotum Harichand, L.M.&S., Chief Medical Officer.
Dr. Nagindas Shivlal Modi, Resident Medical Officer.

This hospital is situated in Mint Road, Fort North, and received up to December 1897 Bhattia patients only. Since January 1898, Pushkerna

Brahmins have also been admitted. A Committee of 18 persons has been appointed by the Bhattia caste for the management of the hospital.

The following are details of the cases admitted from August 18th, 1897, to February 28th, 1898:—

Cases admitted	264	General mortality, 72·80 per cent.	
„ discharged	47		
„ died...	191		
„ remaining	26		

Brahma Kshatri Hospital.

PRIVATE HOSPITAL No. 4.

Medical Officer—Dr. V. S. Divan.

This hospital was opened on January 23rd, 1898, mainly through the exertions of Mr. Ranchoredas Jeenabhoy, for Brahma Kshatris, and has been supported by several rich men of the caste.

The following are the details from the date of opening :—

Cases admitted	40	General mortality, 80 per cent.	
„ discharged	8		
„ died	32		

Of the above 32 deaths, 9 occurred within 24 hours and 10 within 48 hours of admission.

Cutchi Memon Hospital.

PRIVATE HOSPITAL No. 6.

Haji J. H. A. Patel, J.P., Chairman.

Medical Staff.

Dr. V. K. Parulkar, L.M.&S.	Hosp. Assist. G. R. Datik.
Hakim Ajarneswala.	„ G. D. Kale.
„ Abdul Wahab.	Nurse P. D. Choksey.

This hospital is situated in an unfavourable position in a densely populated part of Mandvi. The light and ventilation are not good, the roof being too low. It was re-opened on December 1st, 1897, and the returns are—

Total cases admitted	134	General mortality, 33·58 per cent.	
„ discharged...	39		
„ died	45		

The following is the return of Plague cases treated :—

Plague cases admitted	... ...	77	Plague mortality, 58·44 per cent.
,, discharged	... ...	32	
,, died	... ...	45	

The position of the buboes are given as follows :—

	No.	Died.	Discharged.
No buboes	2	1	1
Axillary	24	16	8
Femoral	40	21	19
Cervical	6	4	2
Multiple	1	0	1
Pneumonic	2	2	0
Plague with "black blister"	2	1	1
Total ...	77	45	32

Dariasthan Lohana Hospital.

PRIVATE HOSPITAL No. 7.

Medical Officer—

The building occupied by this hospital is a caste "Khanawallee." There is a large central court-yard, giving plenty of light and free ventilation. The internal administration and management, however, leave much to be desired :—

Cases admitted	457	General mortality, 73·96 per cent.
,, discharged	85	
,, died	338	
,, remaining	34	

The General Mahommedan Hospital.

PRIVATE HOSPITAL No. 8.

Committee.

Sirdar Oomar Jamal, J.P.

Syed Hissar Hussain Soudani, Secretary.

Medical Officer—Hakim T. Rahiman.

Situated in the Northbrook Gardens, Grant Road, this hospital was opened on January 31, 1898. The cost was in part borne by the community and in part by the Plague Committee.

Cases admitted	297	General mortality, 55·21 per cent.
,, discharged	88	
,, died	164	
,, remaining	45	

Greaves, Cotton & Co.'s Hospital.

PRIVATE HOSPITAL No. 9.

Medical Officer—Dr. I. V. Ramswamy, L. M. & S.

This hospital was opened by the above firm for the accommodation of plague cases occurring amongst their own employés. A low building with small separate rooms was set aside for the purpose, but it is ill-adapted for the purpose, being completely surrounded and shut in by other inhabited buildings.

Cases admitted	62	General mortality, 53·22 per cent.
„ discharged	21	
„ died	33	
„ remaining	8	

The period of detention of the patients discharged was so remarkably short as to call for special comment. The following table gives the duration of their stay in hospital :—

3	for	1	day
5	„	2	days
5	„	3	„
2	„	4	„
1	„	5	„
1	„	7	„
1	„	8	„
1	„	10	„
1	„	14	„
1	„	19	„
Total... 21			

Average, 3½ days.

The obvious inference is that many of the discharged cases had not suffered from Plague at all.

Memon Moholla Hospital for Halai Memons.

PRIVATE HOSPITAL No. 10.

Medical Officer.—Dr. R. H. Ranina, L. M. & S.

Situated in a very narrow street in one of the most densely populated districts of Mandvi, this hospital was eminently unsuitable for the reception of cases of any infectious disease. In case of another epidemic, an endeavour should be made to find a more suitable building.

Cases admitted	62	General mortality, 51·61 per cent.
„ discharged	30	
„ died	32	

Of these 62 cases, 7 were not suffering from Plague. The Plague mortality was 58·18.

Haji Cassum Joosub's Hospital.

PRIVATE HOSPITAL. No. 11.

Haji Cassum Joosub, Chairman.

Haji Ebrahim Haji Mahomed, Secretary and Treasurer.

Medical Officer—Dr. Sydney Smith.

For the purposes of this hospital a house in Abdul Rehman Street was opened last year by some leading members of the Rangari Moholla and was reopened for the second epidemic on October 15th. The building is ill-adapted for the purpose, and a more suitable one should be found.

Cases admitted	52	General mortality, 55·76 per cent.
„ discharged	19	
„ died	29	
„ remaining	4	

Hindu Fever Hospital.

PRIVATE HOSPITAL No. 12.

The Hon'ble Vijbukhandas Atmaram, *Chairman of Committee.*

The Hon'ble Dr. Bhalchandra Krishna,
Mr. Janardhan Gopal,
Rao Saheb Narayan Trimbak Vaidya,
} Honorary Secretaries.

Medical Officers.

The Hon'ble Dr. Bhalchandra Krishna.

Dr. Govind Balaji Kher, L. M. & S.

„ Gurudata Sing, M.D.

About the beginning of January 1897, when Plague was fast spreading in Bombay city, and people were reluctant, through mistaken notions, to resort to the Municipal Hospitals, some of the leading Hindu gentlemen determined to have at least one private hospital for the Hindus, which would assist the policy of Government by inducing people to avail themselves of the institution of their own accord, and thus minimise the evils incident on the concealment of plague cases. With this object in view a meeting of the leading gentlemen of the Hindu community was convened on the 13th of January in the bungalow of Mr. Mangaldas Nathubhai at Girgaum, and it was resolved to arrange for the opening,

at as early a date as possible, of a Hindu Fever Hospital, and to invite public subscriptions for the purpose. About Rs. 850 were subscribed on the spot. Mr. Tribhowandas Mungaldas, in addition to promising monthly subscriptions, undertook to make good any eventual deficit up to Rs. 5,000. A Managing Committee was appointed with Dr. Bhalchandra and Rao Saheb Narayen Trimbak Vaidya as Honorary Secretaries. As caste after caste evinced an interest and came to assist the institution, some leading members from among them were brought on to the Managing Committee.

Mr. P. C. H. Snow, I.C.S., C.I.E., Municipal Commissioner, was then appealed to for the grant of a suitable plot of land for the hospital, and he was kind enough to place a large and airy piece of ground on the Sussex Road, near the Victoria Gardens, at the disposal of the Managing Committee free of rent. The work of erecting necessary sheds was then immediately taken in hand, and the hospital was declared open on the 28th January 1897. It continued in this locality till the end of May 1897. Although the Plague abated towards the end of May 1897, it had not disappeared altogether. It was therefore thought desirable to keep the hospital open, and as it could not be kept in temporary sheds during the monsoon, it was transferred to its present site, a hired bungalow near the Grant Road Bridge. As the demand for accommodation increased, additional sheds were built on the open space adjoining, which the Plague Committee obtained for the hospital from its owner.

There is now accommodation for 30 patients in the hospital, and all the requisites are properly provided. A certain number of beds are reserved for superior classes of people. As the Plague Committee wished that relatives attending their sick in the hospital should be segregated, a shed containing 8 rooms was erected for their accommodation.

At the suggestion of the Plague Committee two sheds were built in Parel Government House compound for the accommodation of those of the convalescents who were fit to be removed there. The place is very airy, and is likely to do good to those who go there. The patients' food, medicine, &c., there will be provided by the Plague Committee.

This is the only private cosmopolitan Hindu hospital where patients of all castes of Hindus, except the low castes, are admitted. The statistics show the number of patients admitted and those discharged or dead. 771 patients have been treated in the hospital, of whom 695 were Plague cases, the remainder being cases of pneumonia, bronchitis, dysentery,

remittent and other fevers. Of the latter 64 were discharged cured, the recoveries being 84·21 per cent. Of the Plague cases, 78 died within 12 hours of admission, 104 within 24 hours, 165 within 48 hours, 181 after 48 hours, and 167 Plague patients, including convalescents in the hospitals, were cured. The percentage of recoveries was therefore 24·03; but if those who died within 48 hours are deducted, the recoveries come to 31·51. Taking into consideration the low stamina of the patients and the advanced stage of the disease in which they are generally brought to the hospital, the result may be considered fairly satisfactory. When the epidemic was at its height, the pressure of space in the hospital was much felt, and occasionally admissions had to be refused.

There were patients of almost all castes of the Hindu community, both Dekhanis and Gujratis. Of the patients admitted, there was a very large proportion of Marathas, Malies, &c. Even latterly, the numbers have not very much decreased.

The Hon'ble Dr. Bhalchandra Krishna, as Honorary Consulting Physician, attends the hospital daily. Dr. Govind Balaji Kher, L. M. & S., is in immediate charge of the hospital, and serves without remuneration. Dr. Gurudata Sing, M.D., is the Resident Medical Officer. The services of the late Dr. M. G. Desai, the first Medical Officer who took charge of the hospital, are very well known. The following doctors also have at different periods given their services :—Dr. L. B. Dhargalkor, Dr. B. P. Pilgaumkar, Dr. S. B. Jethar, L. M. & S., and Dr. R. N. Permanand.

The Chairman of the Plague Committee and its members have frequently visited the hospital and rendered every assistance, so that the relations between them and the Hospital Committee and staff have been most cordial.

Cases admitted	771	General mortality, 70·00 per cent.
„ discharged...	231	
„ died	540	

Omitting observation and other cases, the Plague returns are :—

Plague cases admitted... ...	695	Plague mortality, 75·97 per cent.
„ discharged... ...	167	
„ died	528	

Imambara Hospital for Moguls.

PRIVATE HOSPITAL No. 13.

Aga Abdul Hussein, Esq., Chairman.

Haji Mirza Cazzum, Esq., Secretary and Treasurer.

Medical Officer—Dr. De Silva, L. M. & S.

This is a capital building, light, airy, isolated, and most suitable for use as a private hospital, but more attention should be given to cleanliness and other details of management.

Cases admitted	34	General mortality, 52·94 per cent.
„ discharged	16	
„ died	18	

Islam Nagdevi Hospital.

PRIVATE HOSPITAL No. 14.

This hospital, also known as the Surtee Dawoodbhai Mussabhai Hospital, is the worst situated for its purpose of all the private hospitals. It consists of the upper floor, separated into 4 rooms, of a building which is completely shut in and surrounded by other larger houses. The ground floor is full of stores, and there are no arrangements whatever to recommend it.

Cases admitted	84	General mortality, 54·76 per cent.
„ discharged	35	
„ died	3	
„ remaining	3	

Jain Hospital, Pinjrapole.

PRIVATE HOSPITAL No. 15.

Manekchand Kapurchand, Esq.

Amerchand P. Parmar, Esq., Secretary.

Medical Officers :

Dr. Maganlal Amiashanker Bhatt, L. M. & S.

„ Nagindas P. Mehta, L. M. & S.

This hospital is situated in Lal Bagh, Pinjrapole. The building is a caste dinner house. It makes a capitally light and well-ventilated hospital, and the arrangements and management were excellent. It was founded during the first epidemic by Mr. Manekchand Kapurchand, who has acted throughout as manager. The funds are provided by the community. Though originally intended for Jains, many other high caste Hindus have been admitted. A few observation and other cases have been treated as well as Plague patients. From January 14th

a trained nurse was supplied by the Plague Committee. Two of the staff, an ayah and a ward boy, mother and son, developed Plague and died. Five cases are also recorded in which relatives attending on patients died of plague, having apparently contracted the disease in the hospital.

The three following tables show the incidence of the disease in reference to age, sex, caste, and the position of the bubo. The fourth gives the duration of illness in 381 fatal cases.

I.—Analysis of 510 *Plague cases according to age and sex.*

SEX.	1 to 5 years old.	6 to 10 years old.	11 to 15 years old.	16 to 20 years old.	21 to 25 years old.	26 to 30 years old.	31 to 40 years old.	41 to 50 years old.	51 to 60 years old.	Above 61 years.	TOTAL.
Male	2	8	46	97	103	45	59	42	11	4	417
Female	2	7	17	20	10	9	16	9	...	3	93
Total ...	4	15	63	117	113	54	75	51	11	7	510

II.—The position of the buboes.

Description.		Males.			Females.		
		Admitted.	Discharged	Died.	Admitted.	Discharged	Died.
Femoral	R.	113	30	76	26	8	17
	L.	94	21	71	24	6	14
Inguinal	R.	9	.....	9	2	.....	2
	L.	9	.....	9	3	.....	2
Auxillary	R.	44	11	31	11	3	7
	L.	42	12	28	10	2	7
Cervical	R.	23	4	17	4	1	3
	L.	14	1	13	3	1	2
Multiple		4	.....	4	.....	.....	.....
With pneumonia		28	5	23	4	2	2
Plague septicæmia		37	.....	37	6	.....	6

III.—Admissions and mortality per cent. according to caste.

Caste.	No.	Cured.	Died.	Remaining.	Mortality per cent.
Jains	253	50	192	9	75·88
Banias	99	18	80	1	80·80
Brahmins	45	6	39	.....	86·6
Lohanas	8	6	2	.....	25·00
Goldsmiths	25	6	13	6	52·00
Kansaras	5	3	2	.....	40·00
Carpenters	11	4	6	1	55·5
Bhansalis	5	1	4	.....	80·0
Khasnis	3	2	1	.....	33·3
Tailors	3	.....	3	.....	100·00
Other Hindus	53	11	37	5	69·81
Total ...	510	107	381	22	74·70

IV.—The duration of the illness in 381 fatal cases.

SEX.	In 6 hours.	In 12 hours.	In 1 day.	In 2 days.	In 3 days.	In 5 days.	In 8 days.	In 15 days.	In 20 days.	Total.
Male	38	39	47	50	44	34	37	16	12	318
Female	6	7	12	14	9	8	6	1	...	63
Total ...	44	46	59	64	53	42	43	17	12	381

Cases admitted 588
„ discharged 170
„ died 396
„ remaining 22

} General mortality, 67·34 per cent.

Omitting observation and other cases not Plague :—

Plague cases admitted 510
„ „ discharged 107
„ „ died 381
„ „ remaining 22

} Plague mortality, 74·70 per cent.

Jain Parel Hospital.

PRIVATE HOSPITAL No. 16.

Medical Officer—Dr. V. S. Divan, L. M. & S.

This hospital was opened in April 1897 for the Cutchi Dassa Visa Osval Shrivali, mainly through the exertions of Mr. Damji Laxmichand. The building used is the Jain Sthanak, and it occupies a capital isolated position in the Parel Road.

Cases admitted 326
„ discharged 66
„ died 232
„ remaining 28

} General mortality, 71·1 per cent.

Of these 20 were not cases of plague. The plague mortality is therefore 75·81 of the 232 deaths :—

52 died within 24 hours of admission.
45 „ „ 48 „ „

Excluding the deaths within 48 hours the plague mortality is 64·59.

Jullaha Suni Mahommedan Hospital.

PRIVATE HOSPITAL No. 17.

This hospital in the Ripon Road, Byculla, also known as the Suni Mahommedan hospital, Madanpura, was re-opened in October 1897. The patients were treated by a Hakim, the general management being under the supervision of a Government Medical Officer.

Cases admitted	... 546	General mortality, 50·3 per cent.
„ discharged	... 275	
„ died	... 271	

Many of the above cases were admitted for observation and did not shew symptoms of plague. The following are details of the plague cases only :—

Plague cases admitted ...	... 284	Plague mortality, 70·42 per cent.
„ discharged ...	... 84	
„ died ...	... 200	

Kapol and Lad Joint Plague Hospital.

PRIVATE HOSPITAL No. 18.

Tribhowandas Mangaldas Nathubhai, Esq., J. P., Chairman of Committee.

V. Mohanjee, Esq.,
Jamnadas Lackmidas Mody, Esq., } Honorary Secretaries.

Medical Officers.

Dr. P. Harichand, L. M. & S., Chief Medical Officer.

Dr. Narayan Rao Shengdi, Resident Medical Officer.

The general arrangements and management of the hospital are good. Separate accommodation is provided for suspicious fever cases sent in for observation.

Cases admitted	264	General mortality, 49·62 per cent.
„ discharged	114	
„ died	131	
„ remaining	19	

Many of the cases kept under observation did not prove to be Plague.

Plague cases admitted	172	Plague mortality, 76·16 per cent.
„ discharged	22	
„ died	131	
„ remaining	19	

Khatri Mahommedan Hospital.

PRIVATE HOSPITAL No. 19.

Committee.

Hajee Ebrahim Hajee Oosman. | Hajee Oosman Soleman.
Hajee Isak Isa. | Hajee Soleman Dada, Secretary.

Medical Officer.—Dr. M. N. Disana, L. M. & S.

This hospital is maintained by the community and is situated in Bapu Khote St., Null Bazaar. The accommodation is very limited, and there are no special hospital conveniences. It was re-opened on January 1st, 1898.

Cases admitted	14	General mortality, 50 per cent.
„ discharged	3	
„ died	7	
„ remaining	4	

Kolsa Moholla Memon Mahommedan Hospital.

PRIVATE HOSPITAL No. 20.

Sirdar Khan Bahadur H. Cassum Mitha, J. P., Chairman of Committee.

Hajee Oosman H. Aba, Secretary.

Medical Officer.—Dr. M. N. Disana, L. M. & S.

This hospital was re-opened on September 1st, 1897. It was established mainly through the influence of Sirdar Khan Bahadur H. Cassum Mitha, J. P., for the Halai Memon section of the Mahommedan community, by whom the funds are provided. A segregation house is attached for the accommodation of the relatives of patients admitted. The locality is densely populated and the house has no special convenience for the purposes of a hospital.

Cases admitted	35	General mortality, 60 per cent.
„ discharged	14	
„ died	21	

Nine of these cases were kept under observation but did not develop Plague. They were all discharged cured. The following are the returns of the Plague cases:—

Plague cases admitted ...	26	Plague mortality, 80·76 per cent.
„ „ discharged ...	5	
„ „ died	21	

Kshatrya Hospital, Churney Road Gardens.

PRIVATE HOSPITAL No. 21.

Shanker Manakji Rele, Esq., Chairman of Committee.

Madhavakas Shyidhae,
Chintaman Atmaram, } Secretaries.

Medical Officer—Dr. V. P. Chavan, L. M. & S.

This hospital is situated between Churney Road Gardens and Back Bay, and there is excellent accommodation on a small scale for the members of the community. It was opened on February 18th, 1898.

Cases admitted	43	General mortality, 74·41 per cent.
„ discharged	10	
„ died	32	
„ remaining	1	

Of these there were 3 cases with one death other than Plague. The Plague mortality is therefore 77·50.

The Maratha Hospital.

PRIVATE HOSPITAL No. 22.

Chairman of Committee, Kushaba Chapagi Kale, Esq. Rao Saheb Vithal K. Vandekar, J. P., Secretary.

Medical Officers.

Dr. Parsons, M.D. (Lond.), (to March 1898).
Dr. W. Thomas (from March 1898).
Dr. L. B. Dhargalker, L. M. & S.
Mr. K. M. Chonkar, Resident Medical Officer.
Vaidya Gangaram Dharmaji.

This hospital occupies a splendid open position on the Connaught Road, Byculla. It was established by the Maratha Community, very largely through the influence of Sirdar Mir Abdullaly. A large sum was subscribed by various mill-owners, and the hospital was opened on January 21st, 1898. Further extension of the accommodation soon became necessary, and this part of the expense was borne by the Plague Committee. A special feature of the hospital is that all patients can have a choice of English or Native treatment, separate wards being kept for this purpose. There are also contact and segregation camps. As regards inoculation, Prof. Lustig's curative serum is now on trial at this hospital, but the cases treated thus far are too few for any definite statement.

At present 12 cases (7 males and 5 females) have been inoculated. Of these, 1 male and 3 females have died. Buboes were present in all the cases. A certain selection of cases is made, preference being given to those admitted on the second or third day. Injections are given at intervals of 24 hours, 15 c.c. on the first and 10 c.c. on subsequent occasions. A slight and temporary fall in temperature has been noticed in one case directly after inoculation, and the gland appeared to suppurate more certainly and more rapidly. There is no evidence that any risk attaches to the treatment. The general arrangement of the hospital and camps is excellent.

Statistics of the patients who were under Native treatment are given separately from those who were under English treatment. All detailed statistics refer to the latter:—

	Under English treatment.	Under Native treatment.
Cases admitted	981	261
„ discharged	248	56
„ died	645	176
„ remaining	88	29
General Mortality	65·74	67·43

Many of these patients were not suffering from Plague. The following are the returns of the plague cases:—

	Under English treatment.	Under Native treatment.
Plague cases admitted	738	235
„ discharged	108	44
„ died	542	162
„ remaining	88	29
Plague Mortality	73·44	68·93

The following tables refer to 650 Plague cases which were under English treatment:—

1. *Analysis of patients by age.*

—	Under 5 years.	5 to 10 years.	10 to 20 years.	20 to 30 years.	30 to 40 years.	40 to 50 years.	Over 50 years.
Cases	11	67	127	276	108	32	29
Deaths	7	50	99	237	97	27	25
Recoveries	4	17	28	39	11	5	4

The duration of illness in 582 *fatal cases.*

Brought in dead.	6 hours.	12 hours.	24 hours.	2 days.	3 days.	4 days.	5 days.	6 days.	7 days.	Over 7 days.
14 ...	61	60	96	109	77	46	31	12	9	27

The position of the Bubo.

	Cases.	Deaths.	Recoveries.
No Bubo	149	140	9
Femoral	29	20	9
Inguinal	265	220	45
Axillary...	128	98	30
Cervical...	52	45	7
Parotid	7	5	2
Supratrochlear	2	.....	2
Multiple...	15	10	5
Pneumonic	3	2	1
Total ...	650		

Of the above 650 cases, no less than 349 applied for admission voluntarily.

Marwadi and Fattepuria Hospital.

PRIVATE HOSPITAL No. 23.

Tarachand Ganashan Marwadi, Esq., Chairman.

Chunilal Kushalchund, Esq., Secretary.

Hiralal Ramgopal, Esq., Treasurer.

Medical Officer—Dr. Jagmohandas C. Merchant, L. M. & S.

This building is for the caste "Khanawallee," and well adapted for the purpose.

Cases admitted	86	General mortality, 75·58 per cent.
„ discharged	20	
„ died.....	65	
„ remaining	1	

Modh and Porwad Plague Hospital.

PRIVATE HOSPITAL No. 24.

The Hon'ble Mr. Vijbhukhandas Atmaram, Chairman.

Chhagunlal Brijlal Parekh, Esq., Secretary.

Bhaidas Narotamdas, Esq., Treasurer.

Medical Officer—Dr. Nagindas Manecklal, L. M. & S.

The hospital was first opened on the 17th February 1898 out of the charitable contributions of the leading members of the community—the Hon'ble Mr. Vijbhukandas Atmaram (President), Messrs. Gungadas Vijbhukandas, Dayabhai Tapidas, Chunilal Nagindas, Devkaran Nanji, Bhaidas Narotamdas, Bai Dayakore, &c.

It is situated near the Cowasji Patel Tank Road in an airy and well-ventilated spacious stone building. There is space enough to allow accommodation for 25 patients.

Before the building was taken in charge for the use of the hospital it was thoroughly white-washed and disinfected. Strong solutions were used profusely, and special care was taken to see that all parts of the building were properly disinfected, kept clean and tidy. All excreta and sputum were at once disinfected and removed, and dressings were burned.

Food was supplied to the patients from the hospital under the direct supervision of the House Surgeon and the nurses. Milk, conjee, coffee, tea, Valentine meat juice, Brand's essence of chicken, fruits, soda and ice were the chief articles of nourishment.

Besides one ward-boy to each ward, one or two relations were allowed to attend the patient. In some cases when no relatives attended the patient an additional ward-boy and the services of a special nurse were provided.

The average monthly expenditure was about Rs. 1,500.

Statistics.

Fifty-eight patients were admitted, of whom 36 were males and 22 females. It is presumed almost all cases were admitted after the second or third day of the attack. Not a single case was required to be kept under observation, as all of them showed distinct symptoms of plague. The average age of patients was 25 years.

The following table gives details of the cases :—

Sex.	Admitted.	Discharged.	Died.	Total.	Under Treatment.	Remarks.
Males	36	4	30	36	2	All convalescent.
Females	22	1	14	22	7	
Total ...	58	5	44	58	9	Mortality, 75·86.

The time of death after admission was as follows—

Sex.	In 6 hours.	In 12 hours.	In 24 hours.	In 48 hours.	In 3 days.	In 5 days.	In 15 days.	Total.
Males	3	1	5	8	6	7	...	30
Females	1	...	3	1	4	3	2	14
Total ...	4	1	8	9	10	10	2	44

The above tables will clearly show that though the cases were admitted very late, the average percentage of recoveries comes to 24 per cent.

Out of the 58 admissions, 42 had ordinary plague symptoms, *viz.*, high fever, delirium and bubo, while 9 had pneumonia (with a diffused bubo in the left axilla), the temperature varying between 103 and 105°, respirations hurried and numbering from 50 to 70, tongue dry and furred, sputum containing pure blood, violent delirium, thick speech, pulse weak and compressible.

Among the males that died, 3 had high fever on admission (105°). Within a few hours after admission there was a sudden fall of temperature (97—99), and again after 6 hours the temperature began to rise and the patient gradually died.

A diffused type of bubo was seen in the left axillary region generally accompanied by pneumonia. In these cases the temperature never rose above 103°. One of the patients discharged became insane, and another, a female patient, lost her sight.

Out of the various forms of treatments adopted, stimulants such as spt. ammon. aromat., tr. digitalis., liq. strychninæ, spt. ætheris, sulph. spt. vin gallici, and tr. of musk were found most efficacious. In some cases hypodermic injections of liq. strychninæ, tr. digitalis, aeth. sulph. were found advantageous. In many cases of high fever, wet packs were freely used. External applications used on the buboes were ice, empl. hydrargyri, ext. belladonæ, and linseed meal poultices.

The Mahommed Ebrahim Khoja Hospital.

PRIVATE HOSPITAL No. 25.

Medical Officer—Dr. Khaja Abdullah, L. M. & S.

This hospital was founded last year by Mahomedbhoy Ebrahim Hassun Bhaloo, Esq., and has been maintained at his expense. It re-opened on August 23rd, 1898. A separate building is utilized for segregation of the relatives. Cases of multiple buboes were unusually frequent. One case with 7 buboes proved fatal. Another patient with 5 recovered. Pneumonia was present as a complication in 20 cases, of which 14 proved fatal. Black blisters were present in 5 cases, of which only one recovered. Of the cases discharged cured, 23 were under treatment for fourteen days or less. The patients were treated with native remedies.

Cases admitted	176	General mortality, 48·29 per cent.
„ discharged	88	
„ died	85	
„ remaining	3	

Of the above, 17 were not cases of Plague. One patient suffering from relapsing fever died. The plague mortality is therefore 52·33.

The Nizampura Hospital.

PRIVATE HOSPITAL No. 26.

Hajee Shamsuddin Markay, Chairman of Committee.

Medical Officer—Dr. Khaja Abdullah, L. M. & S.

This hospital is situated in Bapu Hajam Street, near Bhendy Bazaar. The building is in a crowded locality, and has no arrangements to recommend it as a hospital.

Cases admitted	71	General mortality, 50·70 per cent.
„ discharged	30	
„ died	36	
„ remaining	5	

Pathare Prabhu Hospital.

PRIVATE HOSPITAL No. 27.

Dr. S. A. Talpada, Chairman of Committee.

V. A. Kirtikar, Esq., Secretary.

Chief Medical Officer—Dr. A. V. Velkar, L. M. & S.

This hospital has a capital position between Churney Road Gardens and Back Bay. The general arrangements and management of the hospital are excellent. It was opened by the community on February 10th, 1898, and during its first month 40 patients were admitted, of whom 25 died. Of these 10 died within 24 hours and 6 within 48 hours.

The types of plague cases treated during this period were as follows :—

With buboes	77·5 per cent.
Without buboes, but with lung complication	10·0 „
Without lung complication	12·5 „

The following table shows the situation of the enlarged glands :—

Femoral.	Inguina.	Axillary.	Cervical.	Multiple.	Total.
5	11	7	7	1	31

In all the cases admitted there was a clear history of rat mortality in the houses. The majority of these cases presented the characteristic physiognomy, tongue, pulse, injection of the ocular conjunctivæ, and difficulty of speech. The highest temperature recorded was 106°; it varied between 101 to 105° on admission. The pulse rate varied between 100 and 160. Cerebral symptoms were observed in almost all the cases. There were convulsions in four cases (children), and out of these one is convalescent. Severe spasmodic movements were seen in one fatal case. There was

constipation in about 75 per cent. and diarrhœa in about 25 per cent. of cases. Vomiting was not an uncommon symptom. Persistent scanty urine and uroemic symptoms were observed only in one case, which proved fatal. This was the only case out of the forty admitted, which was inoculated this year, a month previous to the attack.

The general line of treatment followed was chiefly stimulant and nutritive. The only antiseptics administered internally were : Liq. Hyd. Per. :—Sod. Sulph. Carb.—Liq. Iodi. Ferr. Chl. For delirium and insomnia bromidia was used with fair success. For hyperpyrexia no depressing antipyretics were used, but ice friction and ice bag to the head were chiefly resorted to for this purpose with good effects.

As for local treatment, application of extract belladonna with tinct. ferii perchloride and extract opii was found useful, as also fomentation. Glands suppurated in six cases, and four of these were incised.

No special method of treatment was tried.

Cases admitted	40	Plague mortality, 62·5 per cent.
„ discharged	10	
„ died	25	
„ remaining	5	

The Port Trust Hospital.

PRIVATE HOSPITAL No. 29.

Medical Officer—Dr. Shivdas Parmanandas, L. M. & S.

This hospital was re-opened on January 12th, 1898. It occupies a convenient position close to the docks and was specially erected during the last epidemic by the Port Trustees for dock labourers. A segregation camp was also maintained in connection with the hospital with separate accommodation for—

(*a*) Contacts.
(*b*) Suspicious case for the Bunders.
(*c*) Patients discharged from the hospital.
(*d*) Observation cases from highly infected localities.

The general arrangements and managements were excellent.

Cases admitted.....	158	General mortality, 75·32 per cent.
„ discharged.....	27	
„ died	129	
„ remaining	12	

Of these, 7 were cases of simple fever. The Plague mortality is therefore 78·80.

Shikarpur—Multani Hospital.

PRIVATE HOSPITAL No 30.

Jevandas Mangumal, Esq., Chairman of Committee.

Messrs. Tirattdas Luxidaram & Co., Treasurers.

Medical Officer—D. H. Freeman Underwood, M. L. D., H. K. & Q. C. P. I., L. R. C. P.

A capital bungalow in Arab Gully Lane was rented by this community, and a portion of the building was reserved for contacts. An English nurse was resident during the greater part of the time.

Cases admitted	14	General mortality, 71·42 per cent.
„ discharged	1	
„ died	10	
„ remaining	3	

The Telegu Hospital.

PRIVATE HOSPITAL No. 31.

Rao Bahadur Ellapa Balaram, Chairman of Committee.

Medical Officer—Dr. V. P. Chavan, L. M. & S.

This hospital is situated in Bazaar Street, Kamatipoora. It was re-opened on July 26th, 1897, and has been maintained entirely by Rao Bahadur Ellapa Balaram. The general arrangements of the hospital were good, but the internal management was less satisfactory. The figures are hardly trustworthy, as the register for one entire month was kept in pencil on a sheet of paper, and 31 cases showed no record of diagnosis or result.

Cases admitted	241	General mortality, 72·19 per cent.
„ discharged.....	67	
„ died	174	

Twenty-five of the above cases, of whom 17 died, were not suffering from plague. The mortality from plague was therefore 72·86. From November 1st to March 31st there are recorded 18 cases other than plague, of whom 15 died. There was one case each of brain tumour, typhoid, and old age, with 15 cases of relapsing fever; the 3 first cases died and 12 of the latter, giving a total mortality of 83·3 and an 80 per cent. mortality for relapsing fever.

The Textile Mill Hospital.

PRIVATE HOSPITAL No. 32.

Medical Officer—Dr. D. R. Wadia, L. R. C. P., M. R. C. S.

This Hospital was opened at the end of December by Messrs. Nowrosji Wadia & Sons for the employés of the Textile and Century Mills, as they objected to being taken to the Municipal Hospital. The hospital occupied a capital isolated position within a convenient distance of the mills and the accommodation and arrangements were excellent.

Cases admitted	6	General mortality, 83·33 per cent.
„ discharged	1	
„ died	5	

The one case discharged was admitted on February 28th and discharged on March 2nd. This gives the impression that it cannot have been a case of plague, and thus the plague mortality stands at 100 per cent.

Thakoordwar Lohana Hospital.

PRIVATE HOSPITAL No. 33.

Moolji Narayan, Esq., Chairman.

Madowji Dharsey, Esq., Secretary.

Haribhai Hemraj, Esq., Treasurer.

Medical Officer—Dr. Nagindas Pranjiwandas Metha, L. M. & S.

This hospital was opened on March 6th owing to lack of accommodation for the large Lohana community at the hospital already provided for them (the Dariasthan Lohana hospital), in Mandvi.

Cases admitted	20	General mortality, 70 per cent.
„ discharged	5	
„ died	14	
„ remaining	1	

Of the above 20 cases, one patient, discharged, was not a plague case.

Plague mortality, 70·68 per cent.

Third Boiwada Hospital.

PRIVATE HOSPITAL No. 34.

Kalabhai Virchand, Esq., Chairman.

Nagindas Dwarkadas, Esq., Secretary.

Medical Officer—Dr. V. S. Divan, L. M. & S.

This hospital was started mainly through the exertions of Messrs. Kalabhai Virchand and Nagindas Dwarkadas, and was re-opened on

December 12th, 1897. The building is in a narrow street, and being very much shut in, is not well adapted for the purpose.

Cases admitted	147	General mortality, 77·5 per cent.
„ discharged	29	
„ died	114	
„ remaining	4	

The Vaishnav Sampravada Maharajah's Servants' Hospital.

PRIVATE HOSPITAL No. 35.

Narsinglal Maharaj, Esq., Chairman.
Chuturbhai Moraji, Esq., Secretary.
Jamnadas Purshotum, Esq., Treasurer.

Medical Officer—Dr. S. S. Miser, L. M. & S.

This is located in Cathedral Street, Pinjrapol, and excellent accommodation was provided for the patients.

Cases admitted	15	General mortality, 66·66 per cent.
„ discharged	2	
„ died	10	
„ remaining	3	

Vassanji Trikamji Hospital.

PRIVATE HOSPITAL No. 36.

Sheth Vassanji Trikamjee, Esq., J.P.
Laloobhi Kalidas, Esq., Manager.
R. Lackamsey, Esq., Secretary.

Medical Officer.—Dr. Munchershaw Disana, L. M. & S.

This hospital was first opened on March 27th 1897. It was closed on July 31st at the close of the first epidemic, and re-opened on December 1st on behalf of the Cutchee Dassa Oswal Banias by S. V. Trikamjee, Esq., J. P., at whose expense it is maintained. It has a capital situation on Clive Road, Dongri, and the building is light, clean and well-ventilated. No nurses are employed, two relations being allowed to remain in constant attendance on each patient. There has been no case of infection amongst these relatives.

Cases admitted	121	General mortality, 73·55 per cent.
„ discharged	32	
„ died	89	

Of the above, 4 cases were sent in for observation and were none suffering from Plague. The Plague mortality is therefore 76·06.

APPENDIX No. 1.

Administrative Details.

Bombay Plague Committee and Staff from its Establishment, March 2nd, 1897.

COMMITTEE :

Brig.-General W. F. Gatacre, C.B., D.S.O., *Chairman.*

P. C. H. Snow, Esq., I.C.S., Barrister-at-Law, Municipal Commissioner.

C. C. James, Esq., C.E.

Surg.-Major H. P. Dimmock, I.M.S.

SECRETARY :

Major W. F. Cahusac, D.A.A.G.

ASSISTANT SECRETARIES :

Capt. C. W. Chitty ; Lt. G. Warneford.

STORE OFFICERS :

Lieut. A. J. Thompson, R.A. ; Lieut. Windham, R.I.M.

ACCOUNTANT.

Mr. Kaikhoshro N. Ranina.

On Lieut. Warneford's retirement, Lieut. F. W. F. Vining, R.N., succeeded him on the 31st of March.

On Capt. Chitty being invalided to Poona on March 15th, Capt. D. S. Welsh of the 2nd Border Regt. was appointed in his place.

Brig.-Surg.-Lieut.-Col. T. S. Weir, Health Officer, was attached as Chief Medical Officer until the 5th of June, when he reverted to the Municipality.

Lieut. Thompson, R.A., and Lieut. Windham, R.I.M., served as Store Officers from March 2nd to the end of May.

When General Gatacre departed from India on July 23rd, Sir James MacNabb Campbell, M.A., LL.D., K.C.I.E., I.C.S., became Chairman of the Plague Committee, and at the close of August Mr. F. W. F. Vining, R.N., became Secretary in place of Major Cahusac.

On Capt. Welsh being summoned to Quetta on military duty, Mr. J. Wastie Green, M.A. (Camb.), was appointed Assistant Secretary.

On December 3rd Mr. W. Barker, B.A. (Camb.), arrived from England and joined the Committee's staff as an Assistant Secretary.

On November 3rd, 1897, the Committee was strengthened by the appointment of Surg.-Major-General G. Bainbridge and on 3rd February following by Surg.-Col. G. Hay, I. M. S., and Mr. Playford Reynolds, M.I.C.E., Superintending Engineer to Government, P. W. D.

In the first week of December Capt. R. M. Betham and Lieut. H. Strong of the 8th Bo. I. came down from Baroda with a detachment, 300 strong, of that regiment for general plague work. The Officers and troops were domiciled on the Kennedy Sea-face.

Capt. H. G. Swayne, R.E., joined the staff on February 9th for the construction of camps and the alteration to houses.

Capt. Clowes, Commissariat Officer, joined the staff as Director of Stores on February 9th and Commander J. Hewett, R.I.M., as District Officer in Tardeo on 12th February.

Messrs. R. B. Stewart, I.C.S., J. H. DuBoulay, I.C.S., and A. M. Wood, I.C.S., assumed charge of Wards A, E, D, as District Plague Officers on February 14th, January 29th, and February 1st respectively.

On Capt. Betham departing on leave on March 26th, Capt. the Hon. R. E. Mostyn, R.A., became Extra Secretary.

On Mr. F. W. Vining, R.N., being placed on sick list on April 1st, Lieut. G. Warneford was appointed *pro tem.* Secretary.

Early in February through the courtesy of Capt. H. Fleet, R.N., Lieut. Mansergh with Lieuts. Henderson, Mason, and Mr. J. Jenkin, (Chief Engineer, H.M.S. "Assaye") and 20 Blue Jackets were put at the disposal of the Committee. These Officers and men were housed in a camp on the Kennedy Sea-face and were chiefly employed in the vacating of infected houses and chawls. In view of the declining epidemic the Naval authorities were informed at the end of March that the services of the above Officers and men could be dispensed with, and accordingly, with the exception of Lieut. Mason, they returned to Naval duty after giving the Committee every satisfaction.

In the first week of February a company of the Durham Light Infantry under Major Ross with Lieuts. Way and Davis arrived from Poona for plague work. Major Ross assumed charge of C Ward South as District Plague Officer, and under him worked the Officers and men of the Durham Light Infantry. On Major Ross' retirement on 25th March, the charge of C Ward was taken over by Captain Bingley, 7th Bengal Infantry.

Early in March a detachment of Sappers and Miners, 50 in number, with two Engineer Sergeants arrived in Bombay for plague duty and were put under the orders of Capt. Swayne for the alteration to houses.

On February 1st Capt. the Hon. R. E. Mostyn with Lieut. Lough and 25 men of the Royal Artillery were placed at the disposal of the Committee and remained on plague duty until March 15th, when Lieut. Lough and the gunners returned to military duty.

On February 2nd, Lieut. Jordan with 2nd Lieuts. Robinson and Rundall with 50 men of the King's Own Shropshire Light Infantry, who had been on plague duty in Hongkong, joined the staff of the Committee and remained on plague duty until the end of March.

Surgeon Julius R.N.'s services were placed at the disposal of the Committee on 24th September 1897. He was placed in charge of the Committee's Detention Camps and a Plague Hospital until he retired through ill-health at the end of February. Staff Surgeon Nicholson, R.N., and Surgeon Bernard, R.N., took his place and remained with the Committee until early in April.

The following Doctors and Nurses arrived in Bombay from England for plague duty in October 1897 and February 1898 and were placed at the disposal of the Plague Committee by the Surgeon-General :—

October 3rd, 1897.	*February* 1898.
Doctors.	
Dr. Miss Corthorne.	Dr. Parsons.
„ F. M. Gibson.	„ Hornabrook.
„ L. G. Haydon.	„ W. A. Justice.
„ R. H. Castellotte.	„ G. J. Blackmore.
„ J. T. Leon.	„ McKenzie.
„ E. L. Hunt.	„ H. D. Packer.
„ F. A. Foy.	„ A. E. R. Laing.
„ L. A. R. Hutchinson.	
„ S. Nariman.	
„ T. F. Pearse.	

Nurses.

Mrs. Pearse.	Miss Buckley.	Miss Harvey.
Miss Evans.	„ Barrow.	„ Greene.
„ Hodges.	„ Bleaney.	„ Smith.
„ Harris.	„ Campbell.	„ Cowdy.
„ Rawlings.	„ Cracknell.	„ Wood.
„ Dawson.	„ Chick.	„ Richardson.
„ McDougall (deceased).	„ Gardiner.	„ Riley.
„ Murphy.	„ Foxlee.	„ Boyd.
„ Grieveson.	„ Bradshaw.	„ Greening.
„ Fry.	„ Hyland.	„ Brown.
„ Hitchman.	„ Truman.	

The accompanying statement shows the District Staffs from June 1897 to April 1898, and the increase and reduction with the rise and fall in the epidemic:—

Year and Months.	District Officers.	District Medical Officers.	Sub-Medical Officers.	Hospital Assistants.	Medical Students.	Lady Doctors.	Nurses.	Inspectors.	Sub-Inspectors.	Storekeepers.	Clerks.	Workmen.	Total.
1897.													
June ...	5	18	8	1	1	2	0	6	25	0	23	638	727
July... ...	5	17	8	1	1	2	0	4	0	2	12	275	347
August ...	5	17	9	0	1	1	0	3	21	2	13	332	404
September ...	6	22	7	0	3	1	1	6	18	2	14	299	379
October ...	5	21	7	0	5	1	2	6	18	2	14	286	366
November ...	5	22	7	0	3	1	2	9	20	2	17	367	455
December ...	5	16	4	0	5	2	4	6	24	1	21	422	500
1898.													
January ...	5	23	15	0	5	2	4	8	23	1	19	735	847
February ...	9	27	19	0	9	3	15	11	53	1	25	1,841	2,023
March... ...	10	29	22	0	10	3	14	10	65	1	26	2,051	2,251
April ...	8	23	16	0	0	3	8	4	33	0	26	1,219	1,355

The following table shows the distribution and the names of the chief members of the Staff at the beginning of March 1898:—

(1) Sections.	(2) District Officers.	(3) Sectional M. Officers.	(4) Disinfecting Inspectors.	(5) Contact Inspectors.	(6) Vacating Officers.	(7) Military Officers.	(8) Medical Students.	(9) Hospital Assistants.	(10) Nurses.
A. Ward, S. ...	Brig.-Surg. - Lieut.-Col. Barker.	Surg.-Lieut. Sealy ...	Mr. D. Rienzi and 4 Sub-Inspectors.	Mr. C. Clark ...	Lt. Mansergh, R.N.	.....	4	.....	Mrs. Hudson.
„ **N.** ...	J. H. DuBoulay, Esq., I.C.S.	Dr. Malegaumwalla. Dr. Divecha. Dr. Kutar. Dr. Dalal.	.....	.....	Police Constable S. Carter	.....	.....	.....	.....
B Ward. ...	Brig. - Surg. - Lieut.-Col. Wilkins, D.S.O.	Dr. Haydon ...	.....	.....	Lieut. Henderson, R.N.	Lieut. Jordan ...	1	.....	Miss Sinclair.
MANDVI ...	.....	Dr. Hussein (M). Dr. Packer.	Mr. Atts ... Mr. Glen	Each sub-section sends its contacts to Camp.	.....	Lieut. Rendell, Lieut. Robinson	1	1	Miss O'Neil.
CHACKLA ...	.....	Dr. Jeykar. Miss Brennan. Asst. Surg. Fenwick.	.....	.....	.....	Capt. the Hon. R. E. Mostyn R.A.	1	.....	Mrs. Birleau. Mrs. Collet.
UMARKHADI ...	.....	Dr. Nariman. Dr. Setna. Dr. Mrs. VanIngen.	.....	.....	.....	Lieut. Lough, R.A.	.....	.....	Mrs. Fitzgerald Mrs. Booth.
DONGRI ...	.....	Dr. Sorabjee. Dr. Pinto.	.....	.....	.....	.....	.....	.....	Mrs. Myer.
C Ward, N. ...	Surg.-Capt. Arnim ...	Dr. Hornabrook ...	Mr. G. Cooper ...	Mr. Allen ...	Lieut. Jenkin ...	Lieut. Way ...	3	.....	Mrs. Cooper.
DHOBI TALAO ...	.....	Dr. Blackmore. Dr. Hustice.	.....	.....	.....	Lieut. Davis	.....	.....	.....
C Ward, S. ...	Maj. W. Ross, D.L.I.	Dr. Munsi.	Mr. Hughes	Mr. Willard	.....	.....	.....	.....	.....
MARKET ...	Capt. Bingley ...	Dr. Chubb.	Mr. O. Kelly						
PHANASWADI ...	.....	Dr. Godinho	Mr. P. Rodrigues Mr. D'Souza	.....	.....	.....	.....	.....	.....
D Ward ...	A. Wood, Esq., I.C.S.	Dr. Shroff ... Dr. Foy.	.....	.....	Lieut. Mansergh, R.N.	.....	.....	.....	Mrs. Hanson.
KHETWADI ...	W. T. Morrison, Esq., I.C.S. (Chairman of Committees), D.	Dr. Seervai	.....	.....	.....	.....	.....	.....	.....
GIRGAUM AND CHOWPATI.	.....	Dr. Mackenzie Dr. Jethar.	.....	.....	.....	.....	.....	.....	.....
E Ward ...	R. B. Stewart, Esq., I.C.S.	Dr. Gallaghar ...	Mr. Murphoy ...	.....	Lieut. Mason, R.N.	Lieut. Warneford	2	.....	Mrs. Murphoy.
BYCULLA ...	.....	Dr. Gibson	.....	.....	.....	.....	.....	.....	.....
MAZAGAON ...	.....	Dr. Britto (M).	Mr. Lyons	.....	.....	Lieut. Christie ...	9	8	Mrs. Turner.
NAGPADA ...	.....	Dr. Laing Dr. Dalal.	.....	.....	.....	Capt. Hartigan ...	1	.....	Mrs. Wells-Willis.
KAMATHIPURA ...	.....	Surg.-Major Barry	.....	.....	.....	.....	.....	.....	.....
TARDEO ...	Comdr. G. S. Hewett.	Dr. Parsons Dr. Hutchinson.	.....	.....	.....	.....	.....	.....	.....
F & G Wards ...	Surg.-Capt. Jennings.	Dr. Bhatawadekar (M) Miss A. Corthorne.	Mr. Hurley ...	Messrs. Valladerer, Mosira, Miller, Munis	Messrs. Domings, Lewis, Pappi.	.....	.....	Messrs. Godwelkar, Narayen, Fernandez	Mrs. Armstrong. Mrs. Overthrow.
PAREL ...	Lieut. C. E. Lewis.	Dr. Contractor (M).	.....	Mr. Holmes	.....	.....	.....	.....	.....
SION ...	.....	Dr. Tavaria	Mr. Wolf	Mr. DeSouza	Mr. Holmes	.....	.....	Mr. Tulgaram, (M).	Miss Storrie.
MAHIM & WORLI	.....	Dr. Dady Burjorjee.	Mr. Hinks	Mr. Gonsalves	Mr. Muers	.....	.....	Mr. Hirabhai (M).	Miss Fernandes.
PAREL HOSPTL.	.....	Dr. Clemow	Mr. Carol	Mr. Fernandez	Mr. Whelpdale	.....	.....	Mr. Sullivan.	Miss Crowdy.
DADAR CAMP ...	.....	Dr. Castellotte	.....	.....	Mr. De Souza	.....	.....	Mr. Calcaprasad.	Miss Mill. Mrs. Graham. Mrs. Gibson.

APPENDIX No. 2.

Finance.

The accompanying statement shows that during the ten months under report (July 1897 to April 1898) the Committee have spent a little under ten and-a-half lakhs of Rupees. The expenditure during the four months of operations against the first epidemic was about three lakhs. The outlay during the past ten months falls under two periods—the six months ending December 1897 and the four months ending April 1898. The totals show that during the first period of six months the charges fell from Rs. 88,901 in July to Rs. 27,089 in September, when they rose to Rs. 49,016 in October, Rs. 53,591 in November, and Rs. 86,047 in December. The average monthly outlay during these six months was Rs. 60,250. It is doubtful whether during these six months the Committee did not err on the side of economy. They made every effort to reduce expenditure, hoping that the disease would gradually depart. At the same time, as has been noticed in the summaries of the months of July to October in Chapter I, the Committee had no alternative but to allow the efficiency of the staff to be reduced. Almost all the covenanted Medical Officers were removed for service on the frontier and in consequence of the united demands of famine and plague neither Military nor Civil Officers could be spared. The chief items that increased the expenditure from Rs. 49,010 in October to Rs. 76,047 in December were the expense connected with the building and maintenance of segregation camps, increased hospital charges, and, the additional staff of Medical Officers and Nurses brought from England.

The period of the second epidemic shows an increased expenditure from Rs. 93,057 in January to about Rs. 2,50,000 in April and an average monthly charge of Rs. 1,57,553 or roughly 1½ lakhs. The low expenditure in March (Rs. 1,64,037) as compared with the very high expenditure in April (about Rs. 3,00,000) is a matter of account. The actual expenditure in April has been less than in March; but the bills for the construction of the great health camps have been held over and were not finally disposed of till after the beginning of April. The increase in expenditure from Rs. 76,047 in December to an average of Rs. 1½ lakhs during the three

following months comes mainly under three heads—(1) Large additions in the number of the staff in all its branches and the employment of several officers of a much higher grade than any whose services had been previously available for district work. (2) Additions to hospitals and hospital charges. (3) Expenditure on camps. The amount expended is doubtless large. Still it may perhaps be admitted that ten lakhs is not too large a contribution to secure the two great objects which have been attained (though by no means solely by the plague measures enforced by the Committee), namely, first the subjection of the death-rate below such a figure as would have caused general panic and flight from the city; and second the reduction of the death-rate in April to so moderate a figure that it ceases to hamper the city and leaves Bombay free to take full advantage of the possibilities of a season of unusual activity and prosperity in most branches of trade.

Plague Committee's Expenditure from March to July 1897 *and July* 1897 *to April* 1898.

Epidemic of 1896-97.		Epidemic of 1897-98.	
Month.	Amount.	Month.	Amount.
	Rs.		Rs.
March 1897...	4,972	July 1897	88,901
April „	28,407	August „	66,887
May „	95,539	September „	27,089
June „	1,39,922	October „	49,016
		November „	53,591
	2,68,840	December „	76,047
Pay of Government Officers debited to advances ...	22,163	January 1898	93,057
		February „	1,23,117
		March „	1,64,037
		April „	3,00,000 (about)
Total ... Rs.	2,91,003	Total ... Rs.	10,41,742

The estimate for April covers all the usual charges for establishment, etc., for the month and also all outstanding liabilities for work done and salaries due, etc., since the appointment of the Committee.

The following table shows the details of expenditure from March 1897 to March 1898.

	1897.										1898.			Total.
	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Establishment	287 4 2	11,372 7 10	70,425 7 3	43,334 9 10	34,165 2 10	15,322 13 2	14,059 0 4	*31,351 7 10	18,615 14 0	21,695 1 0	31,149 0 7	48,200 11 3	76,132 10 0	
Contingencies, &c.	1,645 7 0	2,061 1 7	6,969 12 0	11,822 4 2	8,085 12 3	1,181 8 2	1,018 6 11	1,625 9 8	33 15 11	5,912 5 0	1,464 0 8	17,586 12 11	3,651 1 1	
Purchase of Furniture	629 0 0	8,260 7 0	4,556 0 0	7,782 1 6	7,105 9 6	27 0 0	1,103 0 0	53 4 0	21 13 1	3 0 1	300 2 0	4,800 1 0	608 0 7	
Hire of Furniture..	140 0 0	....	1,052 0 0	77 0 0	58 0 0	74 1 6	75 0 0	620 0 0	69 5 3	.....	.....	.....	176 3 9	
Cooking Utensils, Tables, Articles, &c.	416 4 0	181 6 0	202 3 3	1,767 7 3	272 13 3	10 5 1	1 1 6	16 12 0	22 12 0	3 1 6	145 11 9	9 12 0	12 10 0	
Food Supply..	13 12 0	2,768 10 4	4,379 5 6	6,527 7 5	3,849 13 5	214 11 1	813 11 7	223 3 2	664 6 9	352 6 2	1,921 6 3	5,375 15 3	4,624 3 11	
Disinfectants and Limes	15 10 10	1,706 14 2	71 4 5	26,491 11 1	3,005 4 9	3,158 11 1	1,497 3 0	1,070 4 4	.....	1,132 3 0	998 0 0	889 1 6	33,581 2 3	
Compensation	....	229 0 0	113 12 0	69 3 0	11 0 0	6 0 0	59 12 0	300 0 0	7 3 0	4 0 0	10 0 0	17 6 0	37 3 0	
Medicines	....	22 6 6	1,872 14 10	4,209 10 4	2,940 3 5	567 15 3	137 7 0	144 13 5	133 4 6	4,173 3 9	1,520 5 0	3,163 15 9	5,423 2 2	
Cost of taking Minutes of Meetings ..	130 0 0	112 3 0	....	....	....	....	.....	.....	.....	.....	.....	.....	.....	
Telephone Connections and Alterations.	....	5 0 0	50 0 0	2,330 0 0	65 0 0	25 0 0	.....	.....	.....	.....	.....	136 3 0	.....	
Clothing	1,894 15 10	1,588 10 0	1,356 3 6	8,095 3 5	22. 6 9	143 7 1	247 12 6	68 5 6	53 0 3	343 3 10	219 3 7	1,497 14 0	375 12 0	
Construction	....	16 10 0	4,366 4 1	2,092 10 7	15,156 7 7	26,329 12 1	102 11 7	986 4 5	921 6 4	42 3 0	225 3 11	2,551 4 4	963 0 0	
Gratuity to Patients	....	187 0 0	187 0 0	293 0 0	27 3 0	....	9 0 0	.....	.....	.....	....	0 2 0	.....	
Rent of Grounds and Quarters.. ..	....	....	33 3 5	25 0 0	292 5 4	7,191 2 9	228 13 11	1,523 6 10	300 12 10	213 12 10	126 12 10	242 0 0	2,332 15 7	
Assessment Taxes	....	....	....	9 12 0	....	62 5 0	11 10 2	.....	47 5 4	.....	.....	.....	.....	
Contribution towards Private Hospitals and Camps	....	....	....	....	....	....	.....	.....	.....	.....	1,050 0 0	.....	.....	
Modykhana Parsee Ward	....	....	....	....	....	....	.....	.....	.....	.....	.....	.....	37 14 4	
Total ..	4,973 5 10	28,407 1 5	95,339 11 3	1,14,917 5 7	70,268 12 1	54,369 12 3	16,451 10 4	†37,202 7 2	20,768 9 3	34,378 12 0	38,529 13 2	84,491 10 5	1,27,178 13 3	7,27,466 11 10
* Railway Inspection	....	....	....	5,158 15 9	9,016 5 7	4,768 0 11	5,695 3 0	10,562 1 7	3,793 5 3	4,859 11 9	6,049 7 5	7,766 4 3	6,244 5 3	
* Road Inspection	....	....	....	184 4 0	2,015 4 6	1,775 0 9	1,903 12 7	3,813 13 4	1,921 3 0	1,540 3 7	1,878 13 3	2,109 7 6	1,968 13 11	
* Sea do.	....	....	....	6,979 15 6	4,005 4 2	2,531 10 2	2,349 14 7	10,362 4 11	7,318 11 5	7,512 14 7	6,492 2 0	5,186 5 1	3,635 11 9	
* Observation Camps	....	....	....	12,681 15 7	3,506 1 11	2,442 0 3	688 7 10	9,234 3 3	15,871 14 0	21,449 12 4	37,060 3 2	21,642 10 11	24,374 4 10	
* Palghar Inspection	....	....	....	....	....	....	.....	.....	1,201 1 6	1,694 15 6	785 3 5	408 12 2	109 13 2	
* Kalyan do.	....	....	....	....	....	....	.....	.....	2,906 13 10	3,732 1 1	999 3 2	982 6 7	2 0 0	
* Disinfecting Instruction Class ..	.....	....	....	....	....	....	.....	.....	10 0 0	919 1 9	1,262 6 5	542 3 9	583 9 10	
Total ..	....	....	....	25,005 2 10	18,643 0 2	12,517 12 1	10,637 6 0	33,977 13 1	32,823 6 5	41,669 1 7	54,527 12 3	39,636 2 3	36,858 13 2	3,06,236 5 10
GRAND TOTAL ..	4,973 5 10	28,407 1 5	95,339 11 3	1,39,922 8 5	88,911 12 3	‡66,887 3 9	27,089 0 4	‡71,180 4 3	53,591 15 3	76,047 13 7	93,057 9 5	1,23,117 12 3	1,64,037 9 10	10,32,753 1 3

* This amount is inclusive of Rs. 22,163-3-4 on account of the pay, from March to September 1897, of Government officers deputed on Plague duty and which was in previous months debited to advance account adjusted in October as it was not deemed expedient to recover the charges from Government.

† Deducting Rs. 22,163-3-4, the total is Rs. 15,038-14-10.

‡ Deducting Rs. 22,163-3-4, the Grand total is Rs. 49,016-11-11.

APPENDIX No. 3.

A Selection of Orders, Rules, Notifications and Circulars issued by the Bombay Plague Committee.

A (1). Government of Bombay Resolution, 8th January 1898.
A (2). Plague Authority.
B (1). Duties of District Medical Officers.
B (2). Suggestions for information and guidance of District Medical Officers.
B (3). Duties of District Plague Officers.
B (4). Rules for Sectional Sub-Inspectors.
B (5). Rules for Sub-Inspectors for Disinfection.
B (6). Rules for Disinfection of Buildings, &c.
B (7). List of Stores and Chemicals required on Disinfecting Work.
B (8). Rules for Segregation of Contacts.
B (9). Circular to House-holders *re* Servants' Quarters.
B (10). Circular to District Plague Officers limiting Plague Operations (after riots of 9th March 1898).
B (11). Suggested arrangements for working Native Agencies.
B (12). Instructions to District Plague Officers embodying the New Policy.
B (13). Circulating further Government Instructions.
C (1). Rules for Camps.
C (2). Rules for Disinfection at Health Camps.
C (3). Regulations for the Management of Segregation Camps.
C (4). Notification and Rules for Private Camps in Thana District.
C (5). Circular to labour employers *re* Health Camps.
F (1). Rules for Passes to Travellers leaving Bombay.
F (2). Resolution *re* Sion and Mahim Causeways.
F (3). Rules for Detention of Passengers from infected areas.
F (4). Notice to the Public *re* Surveillance Passes.
F (5). Notice prohibiting passage of suspicious persons to Malabar Hill and neighbourhood.
F (6). Notice prohibiting passage of suspicious persons to North of the Island.
F (7). Special Plague Authority for (5) and (6).

A (1).

Government of Bombay Resolution, 8th January 1898.

RESOLUTION.—In continuation of Government Notification No. 1204-702-P, dated 5th March 1897, His Excellency the Governor in Council is pleased to prescribe the following additional rules for the City and Island of Bombay under the Epidemic Diseases Act, 1897 :—

1. The Plague Committee may appoint Special Officers, either by name or by virtue of office, to carry out or perform, under the general directions of the Committee, any measures or acts devised or ordered by them to be taken for the suppression or prevention of the spread of Plague. Such Special Officers may be known as 'Plague Authorities,' and their powers and duties may be limited as directed by the Committee, and their appointment shall be subject to revocation at any time by the Committee.

2. In the event of any death (whatever may have been the cause thereof) occurring in any house or any building, shed, stable or other place used as a human dwelling (not being an hospital), it shall be incumbent on the principal adult surviving member of the family to which the deceased belonged, or on any adult person who was present or attended on the deceased at the time of death, to give immediate and full information of the death and place where it occurred and of the name and caste of the deceased to the nearest District Medical Officer or Sub-divisional Medical Officer or Plague Authority appointed for this purpose.

3. On receipt of the said information the District Medical Officer or Sub-divisional Medical Officer or Plague Authority aforesaid, as the case may be, shall immediately register the death, and either himself go or send a trustworthy subordinate to the place indicated in order to verify the information given; and thereafter may give the informant a certificate that the death has been registered, which certificate shall, when duly demanded, be produced by the person or persons who shall carry or accompany the corpse to the place of cremation or burial or to a Tower of Silence.

4. Any District Medical Officer or Sub-divisional Medical Officer or Plague Authority aforesaid is empowered to demand production of such a certificate from the persons carrying or accompanying a corpse as aforesaid; and, in the event of such a certificate being not produced, is empowered to detain, or cause to be detained, any one of the funeral party at the place of cremation or burial or Tower of Silence until the name and caste of the deceased and the place where the death occurred have been clearly ascertained.

8th January 1898.

A (2).

Plague Authority.

BOMBAY PLAGUE COMMITTEE OFFICE.

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By order of the Bombay Plague Committee, in exercise of the powers vested in them by Government Notification No. 1204—702-P of the 5th March 1897, it is hereby notified that

Name_____

Address_____

Description_____

is employed by the Committee, until further orders, to carry into effect, under the general directions of the Committee and within the district specified below, such measures as the Committee may be authorized to take, to suppress and prevent the spread of the Bubonic Plague in the City of Bombay, by virtue of the sections and notifications specified on the back hereof, or other the powers enabling them in that behalf.

By order of the Bombay Plague Committee,

Chairman.

District.

Bombay Municipal Act, 1888, sections 422 to 427 (both inclusive) and section 429.

Notification of Municipal Commissioner for the City of Bombay, dated 6th October 1896.

Government Notifications—

No. 228-P, dated 10th February 1897.

No. 1204-702-P, dated 5th March 1897.

No. 1638-A—1107-A. P., dated 23rd March 1897.

B (1).

Duties of District Medical Officers.

(B) The following duties will be assigned to the District Medical Officers, who should, if possible, reside in their own districts :—

(1) To superintend and exercise the sanitary supervision of the whole district in their charge, reporting to the Plague Committee and the Health Officer daily.

Note.—Police Commissioner to be asked to arrange this postal service.

(2) To supervise the working of their District Hospitals and to attend the same in routine.

(3) To supervise the work of Search-Parties in conjunction with the Justices of the Peace.

(4) To control the disinfection of infected areas and buildings, latrines and night-soil depôts.

(5) To inspect all Segregation Camps in their districts.

(6) To call the attention at once of the Officer appointed by Government for the condemnation of insanitary buildings to any such premises in their districts.

(7) To report on registration of burials and cremations in their districts and to supervise the sanitary condition of cemeteries.

(8) To send daily reports to the Plague Committee and Health Officer from 6 a.m. to 6 p.m., giving details of—

(*a*) What has transpired during the preceding 24 hours in their districts.

(*b*) Any suggestions they have to offer.

B (2).

Suggestions for Information and Guidance of District Medical Officers.

THE following suggestions in reference to house-to-house visitation and disinfection are drawn up for the information and guidance of District Medical Officers ; no hard-and-fast rules can in most instances be laid down for this work, and the Committee therefore depend in a great measure on the judgment, discretion, and tact of their District Medical Officers :—

1. It is proposed to employ, as far as possible, the Justices of the Peace who have volunteered their services ; each district will be divided into sub-divisions, and sub-divisions into sections for this duty.

2. The Justices will be asked to attend at the office of their sub-divisions at 7 a.m. on each day.

3. After the muster of the staff under each Justice, they will proceed to their sub-divisions with their staff for house-to-house visitation.

4. It is not expected that the Justices can personally visit every house daily, though it is hoped they will visit as many as possible, and it is presumed that they know their sub-divisions so well that information in regard to sick persons will be quickly obtained by them.

5. The staff allowed to each Justice will be organised according to the number of houses in the sub-division, but the minimum staff will be one Sub-Inspector or Muccadum (native), one Police sepoy, and four Military sepoys. Each Justice, on receiving intimation of, or on finding, a sick person, will make a note of the name of the place and the number or description of the premises, leaving a sepoy on guard to prevent the patient being removed until an ambulance can be obtained.

6. Each Justice, on having inspected the whole of his sub-division, will return to the office of the sub-division to fill in and hand over a report of his morning's work in a printed form provided for the purpose.

7. This procedure will be followed from day to day, and any Justice prevented from attending on any particular day is requested to send an early intimation to the Sub-divisional Medical Officer, who will delegate the work to someone else.

8. Sub-divisional Medical Officers, on receiving reports from Justices, will immediately arrange to send ambulances to the houses in which cases have been reported.

9. Before removal, cases should be visited by the Sub-divisional Medical Officers or one of their qualified assistants, or, in the case of females, by a Lady Doctor, who will arrange for their removal.

10. The bullock carriage at each sub-division should be utilized to convey the family of each patient to the segregation quarters at the hospital in which the patient has been placed.

11. In the removal of sick persons, the Sub-divisional Medical Officer should, in the absence of the District Medical Officer of Health, personally supervise the procedure and submit a detailed report to the District Medical Officer of Health.

12. All commissariat and other arrangements for those people removed will be made by the District Medical Officer of Health or such official as he may appoint in each sub-division.

13. As soon as the sick shall have been removed, Sub-divisional Medical Officers will make immediate arrangements for the thorough disinfection of the infected places as follows :—

(*a*) All rags, bedding, cloths, etc., belonging to persons affected, as well as all kutchra in infected places, shall be carefully removed and immediately burned.

(*b*) The infected place shall then be washed down thoroughly with a solution of Perchloride of Mercury in the proportion of 4 oz. to 30 gals. of clean water in a wooden tub or bucket, a mop being used for all parts within reach, and a wooden hand-pump for parts beyond reach. In the use of Perchloride of Mercury, it must be remembered that it is a virulent poison. In dissolving it, a little common salt should be used.

(*c*) For the general treatment of the building, the measures of the Health Department will proceed as usual.

(*d*) Immediately on the drying up of the disinfected place, lime-washing with quicklime laid on hot should proceed.

(*e*) Sub-divisional Medical Officers will see that this work is thoroughly done, as the checking of the spread of the disease depends upon it.

(*f*) Re-occupation of places so treated should not be permitted without the sanction of the District Medical Officer.

(*g*) Disinfect the moree, nani, privies, and traps, scraping such places as are likely to retain filth.

(*h*) Open out the roofs so as to admit light and air thoroughly.

B (3).

Duties of District Plague Officers.

To carry the increased burthen of work falling on the District Medical Officers, Civil or Military Officers were in most districts appointed to take executive charge, and the following instructions were issued to them :—

To

THE DISTRICT PLAGUE OFFICER.

The District Plague Officer is the Chief Local Plague Officer in his district and is invested with the general control of all Plague operations in his district, ward, or division, of the City of Bombay.

His duties fall under the following heads :—

(*a*) To distribute his charge into suitable major and minor inspection units.

On the correct division of a district the success of Plague measures mainly depends. As a rule the scheme of local sub-divisions should be worked out either in communication with, or with the approval of, the Committee.

(*b*) To arrange and enforce regular daily and special house-to-house visitations. These house-to-house visitations are of four classes :—

(1) Justices' visits.

(2) Visits by local officers.

(3) Occasional district visitations where more than one party combine to search considerable area.

(4) Special general visitations in which a large area is cordoned by police or troops, and many parties unite in searching a whole district.

The discovery of cases greatly depends on the zealous inspections by Justices and local officers, together with the occasional examination of large blocks or areas.

(*c*) To employ and organize a body of informers paid by the month, or better, by results, for the discovery of concealed or other cases of Plague.

The successful Plague management of any badly infected section of Bombay depends to a very great extent on the exertions of an active staff of informers.

(*d*) To discover all local deaths.

Deaths are discovered —

(i) By local Plague and Health Staff.

(ii) By cemetery returns.

An efficient local staff should before the close of each day know every death that has occurred in its charge. For certain reasons this knowledge has to be supplemented by information from cemetery returns. Till lately the efficiency of cemetery returns has been marred by the vagueness or the inaccuracy of the corpse addresses. To remove this defect a notification has recently been issued. It is hoped that before long this notification will secure the clear and true address from which every funeral party starts. The notification does not require the entry of the cause of death. It follows that in each case the ascertaining of the cause of death, whether Plague or not Plague, rests with the local staff. This important detail must, as far as possible, in each case, be ascertained from the family or neighbours of the deceased. Every doubtful case should be treated as a case of Plague, and disinfection of the room and segregation of the family of the deceased should be enforced.

To ascertain daily all deaths in his charge and to satisfy himself whether Plague is the cause of death, is the fundamental duty of a District Plague Officer.

(*e*) To secure that all rooms where Plague cases occur are disinfected and that all members of the infected family are segregated as Contacts.

District Plague Officers should give special attention to the question of Contacts, that is, of members of the family or others who have lived in the room with a Plague case. The necessity of isolating Contacts is undoubted. The practical difficulties in the way of enforcing the necessary isolation are serious. The concessions found advisable in Bombay are shown in the Contact Rules. Since the passing of these rules experience shows that unless worked with energy and strictness, only a small proportion of Contacts are isolated. A considerable and probably the most seriously infected class of Contacts go with patients to hospital. All hospitals have accommodation for one or two relations of each inmate. Even making allowance for this safeguard the number of Contacts in Government Camps (about 400) and in Community Houses (about 100) falls short of the total which should be isolated. The question of securing the isolation of a greater number of Contacts without causing public dissatisfaction is one of the most difficult with which the District Plague Officer has to deal.

(*f*) To remove to Contact Camps or Houses all Contacts whether discovered after or before the death of the Plague case.

The remarks under (*e*) apply to this head. But difficult cases occur. As a rule the correct procedure is to despatch all members of the family found in the sick room to a Contact camp or house at the same time as the patient is sent to hospital.

(*g*) To disinfect infected houses.

The District Plague Officer is responsible for all disinfection whether of vacated rooms or of vacated houses. A room is vacated when a case of Plague occurs in it; a house is vacated in which Plague cases have occurred both during the last and the present epidemic. A special assistant is allotted to each District Plague Officer to carry out disinfection.

(*h*) To vacate infected houses.

The choice of such houses or blocks of dwellings as require to be vacated should be made by the Committee in consultation with the District Plague Officer. As a rule no house should be vacated except houses in which a large or a repeated number of Plague attacks have occurred. The actual work of vacating the houses is entrusted to a special officer, Captain Betham. The duties of the vacating officer are—

(i) To see the house is vacated and closed and marked with the letter V.

(ii) To hand all unclaimed property to the Police or other authority.

(iii) To see that the inmates with their belongings are taken to the Segregation Camp. The time during which the persons evicted are kept in the Health Camp should not be less than 10 days. The District Plague Officer is responsible that all Evicts are brought back to their houses at the end of the 10 days or other appointed period of segregation. The District Plague Officer is further responsible that every vacated house, after disinfection, and with such alterations as make it fit for human use, is ready to receive its former tenants. As a rule no shop should be vacated. The premises should be disinfected, and comunication with the rest of the building be carefully cut off. Similarly, the workshops of home craftsmen—handloom-weavers, blacksmiths, coppersmiths, and others—should not be closed. In such cases the bread-winners should be encouraged to live with their family in a camp at night, and to return to their workshop during the day.

(*i*) To condemn vacated houses incapable of improvement.

The condemning of vacated houses will be settled by the Committee in consultation with the District Plague Officer.

No house should be condemned until an attempt has been made to make the house or certain portions of the house fit for human use. With this object alterations should be attempted to secure sufficient horizontal and vertical ventilation. As a rule vertical ventilation can be best secured by cutting a four feet square opening through each floor, and horizontal ventilation by driving openings through each partition and over every door.

In large lodgings or chawls it may not always be necessary or advisable to vacate more than the ground floor or the floor in which Plague cases have occurred.

In the case of certain houses condemnation may be avoided provided the landlord agrees either to keep certain insanitary portions permanently closed, or to remove the defect by which the entrance of air and light is prevented. In most lodging houses or chawls the offending portion is the basement; in a few the most unwholesome quarters are the attics. Again, in certain buildings the removal of wooden partitions secures for a reduced number of rooms a sufficient supply of light and air.

In many ground floor or one-storeyed tenements, even if uninfected, it is advisable or even necessary to strip the roof of a portion of its tiles.

(*j*) To pay close attention to all rumours and complaints regarding sick or dead rats. To satisfy himself of the correctness of the information. To have the dead rats burned and to secure that every effort is made to stop the progress of rats by flushing drains and closing openings with cement.

(*k*) On such subjects as the flushing of drains and the removal of nuisances the District Plague Officer should communicate direct with the Health Officer to the Municipality.

(*l*) A Plague District is well administered—

(i) When all deaths are accounted for.

(ii) When the bulk of Plague deaths occur in hospital.

(iii) When the number of attacks, that is, of cases discovered before death, falls little short of the total of probable Plague deaths.

B (4).

Rules for Sectional Sub-Inspectors.

1. Each Sub-Inspector is to be present at the Section Head Office for muster not later than 6-45 a. m. Their morning work goes on till 10 a. m.

2. The afternoon hours of work are from 2 till 5.

3. Before and after the hours of work, morning and afternoon, they must present themselves at the Section Office or they will be marked "absent" and be dealt with accordingly.

4. Each Sub-Inspector will have charge of a group of houses assigned him by the Medical Officer, which must be visited thrice a week. He is held responsible for finding out Plague cases occurring in that group and for notifying them to the Medical Officer for examination and removal.

5. He is required to keep a note book for recording the names and addresses of persons removed to hospital and of buildings in which a death has occurred.

6. He must in Plague cases communicate at once with the Sub-Inspector in charge of Disinfection, in order to have that work promptly proceeded with.

7. He must submit to the Medical Officer, when the day's work is over, a list of the houses he has visited, the number of cases, real or suspected, he has discovered, and state whether notice has been duly given to the Disinfecting Officer.

8. The Sectional Sub-Inspectors must clearly understand that the principal duties of the entire staff resolve themselves into two :—

Firstly, the discovery of Plague cases and deaths.

Secondly, the disinfection of Plague premises.

9. They are not to interfere in any way with halalcores or the sanitary staff of the Municipality. They should bring nuisances to the notice of the Medical Officer and leave it to him to take action.

10. The Sub-Inspector must understand that any Plague case or death reported late or from outside sources, and not through his instrumentality, reflects on his efficiency. If he keeps actively in touch with his section, he ought to know what happens in it.

B (5).

Rules for Sub-Inspectors for Disinfection.

1. It is the duty of the Sub-Inspector in charge of Disinfection to secure the thorough disinfection of all rooms where a Plague case has occurred. The disinfection by Perchloride of Mercury must be complete within 6 hours of removal of a case by day. The period may extend to 12 hours if the cases are removed at night.

2. The value of a Sub-Inspector will depend not only on the thoroughness of his work, but also on the promptitude with which it is executed.

3. The disinfecting procedure is as laid down in Plague Committee's Circular, dated 1st January 1898. Each Sub-Inspector must have a copy with him and is responsible for instructing his staff in the details of his work.

4. He is expected to work cordially with the Sectional Sub-Inspectors, each member of the staff loyally co-operating with the other for the discovery of cases and speedy disinfection of rooms.

5. He will keep a note book for recording day by day—

(*a*) the rooms or houses he has disinfected ;

(*b*) those remaining to be disinfected.

6. He is responsible for painting the Plague mark and date on every place he disinfects.

B (6).

Rules for Disinfection of Buildings, &c.

1. Immediately a patient has been removed, the following disinfecting measures should be put in operation.

2. All rags, bedding, clothing of the patient, and kutchra generally should be carefully lifted, removed, and burned outside the building. In placing the articles outside they should be carefully laid down (*not thrown down*) so as not to raise dust.

3. No brushing of walls or floor should on any account be permitted. This is a most dangerous proceeding and likely to spread infection.

4. The first work in all instances is to flood the floor of the infected room with a solution of Perchloride of Mercury not weaker than 1—1,000. The junction of floor and walls and all corners should then be mopped with the solution, as well as the walls as far as the mop will reach, and beyond this a small hand-pump should be used. The floor, if of earth, should then be dug up to a depth of 4 inches. (But this must on no account be done before the surface has been flooded with the solution.)

N. B.—The solution of Perchloride of Mercury, 1 to 1,000, may be prepared by adding 2 lbs. crude of Hydrochloric Acid to 100 gallons of water and then dissolving the mercury in it, with a handful of common salt to expedite dissolution.

5. All furniture that can be dealt with should be likewise disinfected with this solution either with a pump or a cloth.

6. After the work has been thoroughly done and the solution has dried, lime hot, and in as strong a solution as possible, should be laid on all the walls, the floor and ceiling.

7. Articles of value, likely to have been infected, should be classified according to their nature—

(1) Those which can be boiled, if of cotton, to be boiled for 3 hours in a 3 per cent. solution of soft soap with water, or steeped in Perchloride of Mercury solution after being washed (woollen clothes worn by a patient to be burned), and then exposed to the sun.

(2) Articles which from their size or value cannot be boiled should be disinfected with a 5 per cent. solution of Carbolic Acid, which should be allowed to dry upon them.

(3) Articles which can neither be boiled nor so disinfected, should be exposed to the sun.

8. In parts of buildings where insects are likely to be harboured, kerosine oil should be applied with a syringe, or boiling water poured over them.

9. In the event of the whole house requiring disinfection, the order of procedure should be—

(1) Privies with their shafts;

(2) Staircases and corridors;

(3) The rooms in order;

first by washing every part with the Perchloride of Mercury solution, and then laying on the hot quicklime.

10. All nahanis, nahani pipes, morees and traps should be carefully flooded with Perchloride, and where necessary, entirely replaced at the expense of the owner of the premises.

11. As a measure of precaution Carbolic Acid powder or dry Chloride of Lime may be sprinkled inside buildings adjoining the infected one.

12. In the use of Perchloride of Mercury, a virulent poison, its properties, when coming in contact with organic compounds, should be remembered.

13. A reward for dead rats may be given. They should be burned with straw and kerosine oil.

N. B.—The disinfectant action of Perchloride on clothes is increased by the subsequent soaking of them in Phenyle.

B (7).

List of Stores and Chemicals required on Disinfecting Work.

Names of Articles.	Rate.	Per	Amount required per 1,000 square feet.
	Rs. a. p.		
Leather Dholes	.....	.....	.....
Manual Fire-engine with 60 ft. delivery hose, "nozzle," the usual suction hose	650 0 0 to 800 0 0	Each.	*Vide* Notes.
American rotary pumps with 3 ft. suction hose and 50 ft. delivery hose with nozzle 10 inches long and couplings to fit the pumps	108 0 0	"	Do.
Brass hand garden pump ...	7-0-0 to 22-0-0	"	.....
Wooden pump	2 8 0	"	10 for 25 houses.
60-gallon casks to be fitted on country carts	5 0 0	"	4 for every ½ furlong.
30-gallon tubs	2 10 0	"	12 always.
Wooden buckets	.....	.....	24 do.
Wooden hand-cart from Municipality	.....	.....	1.
Coir rope, 2 inches thick ...	1 4 0	100 ft.	.....
Hemp rope, 1" do.	.....	.....	.....
Coir string	0 10 0	Cwt.	.....
Coir rope for fastening water casks	.....	.....	.....
Reed lime-washing brushes ...	.....	.....	.....
Old paint tins, empty, for lime-washing	.....	.....	40 or more.
Curry-stones with rollers for grinding disinfectants	1 2 0	Each.	2 always.
Teakwood planks, 10'×12"×2", for rotary pumps	0 6 0	Ft.	2 cut into 5 ft. lengths.
Bamboo ladders, 10 ft. long ...	1 0 0	Each.	8.
Bamboos, 2½" dia., 30 ft. long ...	0 6 0	"	50.
Do. 2" do. ...	0 5 0	"	50.
Red ochre in lumps for marking houses	0 3 0	lb.	2 lbs.
Hurricane lanterns	3 8 0	Each.	3.
Kerosine oil for lamps and burning clothes	2 4 0	Tin.	As required.
Wick for above for Hurricane lanterns	0 1 0	Yard.	.....
Galvanized-iron buckets	0 14 0	.....	6.
Scale and weights, ½ oz., 2 oz., 4 oz., 8 oz., 1 lb.	.....	.....	1 set.
Garden watering cans with hose.	0 12 0	Each.	12 for 500 houses.
Copper wire for binding hose ...	.....	.....	30 feet.
Pickaxes	.....	.....	.....
Powras	.....	.....	.....
Cocoanut oil	.....	.....	.....
Earthen pans for Nitric Peroxide.	.....	.....	12.
Tin funnels, large size	0 4 0	.....	1 to each cask.
DISINFECTANTS.			
Perchloride of Mercury	5 0 0	Lb.	½lb. to 1,000 sq. ft.
Common salt	2 0 0	Maund.	14 ozs. to the above.
Carbolic Acid	2 8 0	Gallon.	1 gallon to 800 sq. ft.
Chloride of Lime	15 0 0	Cwt.	As required, *vide* Notes.
Unslaked lime	25 0 0	Ton.	1½ cwt. to 800 sq. ft.
Permanganate of Potash ...	1 12 0	Lb.	6 ozs. to 2,250 c.ft.
Copper filings } for Nitric Peroxide	0 9 0	Lb.	*Vide* Notes.
Nitric Acid } for Nitric Peroxide	5 5 0	Gallon.	*Vide* Notes.

B (8).

Rules for Segregation of Contacts.

Definition of terms :—

(1). A "contact" means a person who has lived or is living in the same room or part of a dwelling with another person attacked by plague, or who has visited or waited upon such person.

NOTE.—Public officials visiting infected dwellings on duty are exempted from this definition.

(2). A "Public Segregation Camp" means a camp or place established for the segregation of "contacts" or of travellers suspected of having been exposed to infection.

(3). A "Private Segregation Camp" means a camp, house, or other place approved by the Plague Committee or the District Medical Officer for the purpose of the segregation of "contacts."

(4). A "District Medical Officer" is a qualified medical man serving under the Bombay Plague Committee, who is for the time being in charge of a district of the City of Bombay.

In any room where a person has been attacked with illness so suspiciously like Plague that the case has been sent to hospital, the family who live in the same room must be kept under medical observation till the Hospital Authorities declare whether the case is, or is not, one of Plague.

If the Hospital Authorities declare the case to be Plague, the members of the family living in the same room, who have not accompanied the patient to the Hospital, must, under the special conditions stated below, be considered to be contacts, and taken to a Segregation Camp :—

(*a*) On occurrence of a case of Plague in a small house or dwelling, all the contacts are to be removed to a Segregation Camp, public or private, as may be directed by the $\frac{\text{District Medical Officer}}{\text{Plague Authority}}$.

(*b*) In the case of a seizure in a large chawl, unless several attacks occur in different parts of the building, it will not usually be necessary to segregate the inmates of more than from one to three rooms. But in other cases it will be essential to empty a storey, or even the entire building, and to segregate the contacts in Public Segregation Camp or, under the special permission of the Committee, in a Private Segregation Camp.

(*c*) In large private houses or hotels the occurrence of a case or two of Plague may, in the first instance, be treated (after the isolation, in an Hospital, of those attacked) by segregating the Contacts in other parts of the same building, or in buildings, tents, or huts immediately adjoining the infected house, or within the same enclosure. But with a further spread of the disease complete evacuation of the suite of rooms, or the storey, or the whole building (as may be thought necessary), together with segregation of the inmates and other Contacts, is to be carried out.

(*d*) With the written consent of the Bombay Plague Committee or of $\frac{\text{its District Medical Officers}}{\text{a Plague Authority}}$, and provided that they remain segregated and otherwise comply with the orders from time to time issued by the said Committee or by the $\frac{\text{District Medical Officers}}{\text{Plague Authority}}$, the inmates of large or isolated private houses or hotels of the better class among those above-mentioned [Clause (*c*)], and situated in fairly healthy localities, will be permitted to pass the period of segregation in a Private Segregation Camp. In the absence of an approved Private Segregation Camp, the inmates, and other Contacts, of all such dwellings will be removed to a Public Segregation Camp.

If Plague appears among the occupants of large rooms inhabited by several families of persons,—Mochis for example,—it will at first be enough to segregate the infected family in a Public Segregation Camp, and disinfect and limewash their portion of the room, and the common privies and bathing-places.

If a second attack should occur, all the inmates of the dwelling will be removed to a Public Segregation Camp.

A casual guest attacked by Plague in an inn or eating-house shall be detained in an Hospital, but it will not be necessary to treat others in the house as contacts unless the person attacked has lived in the house.

In the latter case the treatment of the other inmates will depend upon the circumstances, and $\frac{\text{District Medical Officers}}{\text{Plague Authorities.}}$ are empowered to take the requisite action for their segregation, if necessary.

When persons attacked by Plague are found in dwellings other than their own homes, full inquiry should be made at the latter by the District Medical Officers as to the existence of Plague therein.

Contacts in the dwellings of infected persons who work in their houses (goldsmiths, coppersmiths, hand-loom weavers, &c.) will be dealt with according to the judgment of the $\frac{\text{District Medical Officers}}{\text{Plague Authority}}$; provided that the sick are isolated in Hospital and the dwellings disinfected.

The period of segregation for contacts shall be ten days, but this may, under the orders of the Plague Committee, and for urgent reasons, such as overcrowding of the camps, be reduced to seven days.

In special cases, when supervision can be ensured, contacts may be released on surveillance, under the orders of the Plague Committee, after passing seven days in a Segregation Camp.

2nd December 1897.

B (9).

Circular to House-holders *re* Servants' Quarters.

Two cases of Plague have recently been found, one among the servants and in the compound of a gentleman residing on the Cumballa Hill, and the other under similar condition on Malabar Hill.

Previous to this no cases have been recorded on the Hill for several months.

Residents are, therefore, requested to second the efforts of the Plague Officers and to see that—

(1) All the servants' quarters and cook-houses are at once cleaned and whitewashed.

(2) That no outsiders live in the compound among the servants, and that families of servants do not reside with them, thereby reducing the population as much as possible.

(3) That all kutchra is daily swept up and burned.

(4) That on a case of sickness occurring among the servants intimation is at once sent—

(*a*) to the Plague Office near the Post Office, Malabar Hill, or

(*b*) to the Office near Messrs. Kemp and Co.'s Shop, Cumballa Hill.

B (10).

Circular to District Plague Officers limiting Plague Operations after Riots of 9th March 1898.

17th March 1898.

To

THE DISTRICT OFFICER,

WARD.

MEMORANDUM.

In accordance with instructions issued by Government, all Divisional and Sub-divisional Officers are to see that—

(1) There is to be no compulsory search in any house unless the fact is reasonably established that it is a Plague-infected house.

(2) No patient is to be removed to a plague hospital unless the case is undoubtedly a Plague case; and no medical certificate shall be accepted as evidence that the case is one of Plague, unless it is signed by a fully qualified Medical Officer.

(3) No Plague case which a fully qualified Plague Medical Officer may pronounce to be hopeless, shall be removed to hospital without the consent of the relatives.

(4) No inmates of a house are to be removed without intimation being given to the head of family.

(5) When any damage is caused by destruction of property (to diminish risk of infection) compensation must in the case of the poor be paid on the spot; and that there should be no destruction of property when disinfection will suffice.

B (11).

Suggested Arrangements for working Native Agencies.

In each District or Sub-division of a District a Committee of Native Gentlemen should be formed, whose duty will be to discover cases of Plague in their districts.

The best means of doing so is to sub-divide the District into small portions, each under a house-visitor appointed by Local Committee, who should look after from 200 to 400 inhabitants.

Each member of the Committee should have a certain number of such house-visitors working under him, and should receive daily reports from each.

Each house-visitor should daily see or enquire about all the people put under his care, and, when there is a case of sickness, report it to his superior, who should arrange to send a medical man or nurse to see the sick person.

Should the sickness prove Plague, arrangements should be made by the Committee to send the sick person to hospital, and to have the Contacts segregated. Also to have dirty clothes burnt and bedding and other clothes disinfected at one of the Steam Disinfectors.

All cases of Plague should be reported to the District Plague Officer, who will arrange for the necessary disinfection of the house, &c. It will be a sign of careless work on the part of a house-visitor if repeated cases of death occur without it being previously known that the persons were sick.

Each Committee should amplify the above where considered necessary.

B (12).

Instructions to District Plague Officers embodying the new Policy.

22nd March 1898.

To

THE DISTRICT OFFICER,

WARD.

In continuation of the rules forwarded to you on the 17th instant, as laid down by the Secretary to Government in his No. 1904 of the 17th, the Committee desire to draw your attention to the following observations :—

Under the revised system of Plague operations which Government desire should be brought into force immediately, the chief principle involved is that of house-visitation being carried on by the people themselves, as indicated in the above mentioned rules. Plague officials will search only those houses where the fact is reasonably established that Plague cases or deaths have recently occurred. There are many such houses within the City, but unless a house is shown by the rings or is known to the District Officer to have recently had Plague, it must not be considered to be an infected house; neither should houses where Plague cases have recently occurred be kept longer under surveillance than is considered absolutely necessary by the District Officer. A house thoroughly disinfected may, after that operation has been completed, be considered a clean house.

In regard to house-visitation by native gentlemen, the best means to effect this visitation is to form a series of small Plague Committees for each district or sub-district within each ward. If a district has too large an area it should be divided twice or thrice or into smaller sub-divisions of such size as can be thoroughly inspected in two or three days by a small Committee; this small Committee to be appointed from the names of those gentlemen who have already been working or who have volunteered their services to Government. Each Committee will be under the District Officer and Sectional District Officer, to whom they will be directly responsible. The gentlemen appointed to this Committee should be chosen from those who principally live or have large interests in the neighbourhood. Each Committee should appoint its own Chairman and Secretary, and the District or Sectional Officer, who in every case is the official Chairman, should arrange to meet these gentlemen and help to apportion streets or parts of streets in which one or more members of the Committee will be responsible for the house-visitation.

The success of the new organization will depend very greatly on the close touch the District Officers or Sectional District Officers keep with these Committees, as, unless backed by help, the movement will in many parts of the City be a failure, and His Excellency the Governor in Council desires to impress upon District Officers the paramount importance of securing the cordial and energetic co-operation of Heads of Communities or Sections of Communities, however humble their nominal social position may be, and he looks to them to secure by tact, patience and kindness, the cheerful good-will of the population and the success of the volunteer organization now initiated.

Reports from the Committee will go to the Sectional District Officer, and from him in the ordinary way to District Officers daily. Disinfection will continue as before and contacts will be removed as laid down in Rule 4 of Government letter. The rules in regard to the vacating of houses will continue, but should be modified and

worked in conjunction with these Committees. Government desire also that these Committees shall be worked in conjunction with the Central Grievance Committee sitting under the Chairmanship of Mr. DuBoulay at the Town Hall, and complaints heard by that Committee, if well founded, will be referred to the District Officer and the Local Committee of the area to which they refer. It is requested that arrangements be made to give such complaints thorough investigation, after which a report should be forwarded to the Bombay Plague Committee, who will take the necessary action.

Another revision which Government desire shall be immediately attended to is, that under the new arrangements the services of as many subordinates and lower subordinates as possible shall be dispensed with. It having been laid down that only a Medical Officer with fully qualified degrees is to give an opinion on Plague cases, it follows that Medical Students and Hospital Assistants will no longer be of use in house-visitation. District Officers should therefore give this matter their early consideration and submit lists of staff which they propose to reduce.

In the event of a case of plague occurring in the family of a well-known and well-to-do respectable person, Government desire that if the house is a detached one, and if the patient can be isolated, and if the family agree to remove to one of the Committee's Health Camps or dwell where they can be placed under supervision, the Plague Committee will allow the patient to remain in the house and can be attended to there by his own Doctor and one or two members of his family.

B (13)

Circulating further Government Instructions.

No. $\frac{2137}{P}$

GENERAL DEPARTMENT,

25*th March* 1898.

To

THE CHAIRMAN,

BOMBAY PLAGUE COMMITTEE.

SIR,—In continuation of my letter No. $\frac{1989}{P}$, dated the 18th instant, I am directed to convey the following further instructions for the guidance of your Committee :—

(1). Persons should only be compulsorily removed by order of a Plague authority to a health or segregation camp when their house is known to be infected with Plague and when they are unable to satisfy the Plague authority that they will remain under observation in a sufficiently isolated and convenient place.

(2). Voluntarily removal to a health camp or other place of safety should be encouraged by all means possible.

(3). If a Plague case can be suitably treated and isolated in a house of sanitary situation free from danger of spreading infection, the patient may be allowed to remain provided the other occupants (save the immediate attendants) remove themselves elsewhere as above stated.

(4). In the case of all removals sufficient time should be allowed, under proper observation, for the making of the necessary arrangements.—I have, &c.,

H. S. LAWRENCE,
for Secretary to Government.

Copy forwarded for information and guidance to District Officer, Ward.

C (1)

Rules for Camps.

I. On admission to the camp everyone before being allowed into the wards must be medically examined and have their names, castes, and date of arrival, &c., registered.

II. The wards have been detailed according to the various castes, and new arrivals ought immediately to make known their caste in order that they may be shown to their proper wards.

III. At 7-30 a.m. and 4-30 p.m. a bell will be rung and everyone must assemble between the wards for the muster-roll to be called. All must attend excepting the patients in the observation and hospital wards, and those to whom special permission has been given for being absent. No one after falling in will be allowed to leave the place assigned till discharged by the officer taking the roll.

IV. All clothing is to be disinfected on admission and before discharge from camp.

Cotton clothing is to be placed in the sun for two hours; woollen and cloth fabrics are to be put in a disinfecting tank.

No one will be allowed to leave the camp unless these two disinfections have been performed.

V. A post-box is placed at the main entrance gate, and is cleared twice a day. Stamp and writing materials may be obtained at the shop at current rates.

VI. No smoking or naked lights will be allowed in the wards at any time.

VII. All complaints must be addressed to the Chief Medical Officer.

VIII. A case of persistent temperature that does not show any sign of yielding to treatment should *be sent to hospital after 24 hours.*

IX. Rations will be issued after morning roll. It must be understood that those only whose subsistence depends solely upon their daily wages are entitled to Government ration. Those who can afford to pay for rations must obtain them from the camp contractor at the established rate.

C (2)

Rules for Disinfection at Health Camps.

If there is a Steam Disinfector at or near a camp, all clothing and bedding should be passed through it—(it would be well to have Central Disinfection Station for camps)—and the people arriving should have their persons washed and be given a douche of 2 per cent. solution of carbolic acid or phenyle solution.

If there is no Steam Disinfector at or near camp, arrivals from a healthy locality may enter the camp at once after washing, if their kit is clean.

But arrivals from a suspected locality and dirty people should have their persons washed, the washing being finished with a douche of 2 per cent. carbolic acid solution. Their personal clothing should be put to soak in a 1—1000 solution of perchloride of mercury for ten minutes. The clothing of children should be dipped in plain water after being soaked, to prevent risk of poisoning.

All clothing and bedding in the camp should be exposed to the sun daily for a few hours.

C (3).

Regulations for the Management of Segregation Camps.

(*Framed under G. R. No.* $\frac{5279}{5434}$-P *of 29th September* 1897.)

1. The area occupied by a Segregation Camp shall be deemed to be a place of observation within the meaning of Rule 29 of the General Rules under Act III of 1897.

2. No person or persons shall enter a camp without a pass from the Bombay Plague Committee except (*a*) persons sent to the camp for segregation ; (*b*) Superior Officers holding powers under the Plague Committee ; (*c*) Police Officers on duty.

3. No visitor or pass-holder shall on any pretext enter a camp between sunset and sunrise.

4. Visitors may enter a camp between the hours of 8 a.m. and 5 p.m., provided they have first obtained a brass pass at the entrance gate and have entered their names and addresses in the address book kept there. This regulation may be suspended at any time by the Chief Medical Officer of a camp for such period as he may think fit.

5. No visitor will be allowed to leave a camp until he has returned his brass pass and signed his name against his former signature in the address book at the entrance gate.

6. The number of visitors in a camp at any one time during the day shall not exceed 200. All visitors and temporary pass-holders must leave a camp when ordered to do so, or, failing orders, before 5 p.m.

7. Permanent pass-holders on showing their passes may enter a camp at any time between sunrise and sunset, but must leave the camp before sunset.

8. Surveillance passes may be granted by the Chief Medical Officer of a camp to such applicants as he may think fit, provided he is satisfied that such applicants are persons of respectability and position, and provided the headman or one of the leaders of the community or communities to which such persons belong (on direct personal knowledge or after special satisfactory inquiry) stands surety for them and undertakes that they will return to the camp for medical inspection when and as often as they may be required to do so; and provided also that such persons show no suspicious symptoms. If inmates let out of camp on surveillance fail to appear and produce the members of their party at any of the times appointed by the Chief Medical Officer of the camp, the sureties of such inmates will be posted as defaulters and the continuance of the concession of surveillance will be endangered. It follows that all leaders should take such zealous and intelligent interest in each candidate as to prevent the risk that the candidate will incur on failing to carry out his undertaking, and the surety, equally with the defaulter, be involved in the disgrace attendant thereto.

9. Surveillance passes may be granted by the Chief Medical Officer of a camp at his own discretion in extraordinary cases (such as for marriage or funeral ceremonies or other cases which do not permit of delay), provided the grantees show no suspicious symptoms.

10. Surveillance tickets will be issued only between the hours of 8 a.m. and 11 a.m.

11. No person will be granted a surveillance ticket who has not first been photographed.

12. Surveillance ticket-holders shall return to the camp from which they procured such tickets between the hours of 8 a.m. and 11 a.m., on the day or days specified by the Chief Medical Officer of the camp, and shall not depart again from such camp until their tickets shall have been duly endorsed.

13. No person detained within a camp shall be allowed to communicate with persons outside the limits of the camp where he is detained, except with the express permission of the Chief Medical Officer of the camp.

14. No person or an inmate, whether a pass-holder or a camp servant, shall leave a camp at any time otherwise than by the recognized entrance gate and with a pass or special permit signed by the Chief Medical Officer of the camp.

15. All persons whatsoever, detained or being within a camp or occupied or employed in connection therewith, shall be subject to the orders of the Chief Medical Officer of the camp.

16. Any person leaving or attempting to leave a camp, except as laid down in Rule 12, or in any other respect disobeying these Regulations, is liable to be prosecuted under section 188 of the Indian Penal Code and will be dealt with accordingly.

C (4).

Notification and Rules for Private Camps in Thana Districts.

PERSONS resident in Bombay will be permitted to reside in camps of their own construction at selected places in the Thana District on the following conditions :—

1. Parties consisting of any number of parties to be formed. For each family a person (headman) who can, in the opinion of the Collector (or other person authorized by him), be trusted, will make himself responsible.
2. The site to be occupied will be allotted by the Collector and as far as possible according to the wishes of the party.
3. Each family to build its own shed. Ten feet to be left between each shed and thirty feet between each line of sheds.
4. The headman to be responsible for the cleanliness of his party's camp and for the using of an allotted site for natural purposes.
5. A register of persons permitted to reside in the camp to be kept, showing the number of persons in each shed. The register to be open to inspection by any Plague Authority at any time.
6. The headman to be responsible that every case of sickness in the camp is at once reported to the nearest Plague Authority or to such person as may be appointed for each camp.
7. The headman to be responsible that all orders which the District Magistrate may find it necessary to issue by reason of Plague in the camp will be obeyed without trouble.
8. The headman to be responsible for damage done to trees or other property near the camp by members of his party.

9. Each member of the party to undergo medical inspection before leaving Bombay in the first instance.

10. Only the working members of each party to be allowed to go to Bombay daily. Each such person to travel only on a monthly railway pass.

11. The headman to be responsible that no member of his party leaves the camp to live elsewhere. Any person sleeping out of the camp for one night to be considered to have gone to live elsewhere.

12. Each party to make its own arrangements for its supply of food. Until ten days have elapsed from the arrival of the party in camp, none of its members to go into neighbouring villages.

13. The camp site to be vacated and sheds cleared away within a week from the receipt of an order from the Collector, when the latter shall consider that there is no longer any reason why persons should not return to Bombay.

14. These conditions to be accepted in writing by the headman. Any breach thereof may be punished at the Collector's direction by withdrawal of permission to use the camp site.

R. P. BARROW,
Collector and District Magistrate, Thana.

BANDRA, *9th February* 1898.

C (6).

Circular to Labour Employers *re* Health Camps.

To prevent the departure of dock labourers the Port Trust Contractors have, I believe, put up sheds for their men, and I understand have by this means succeeded in securing their stopping in Bombay.

II. The Plague Committee are anxious that provision should be made for all persons whose departure from Bombay would cause inconvenience to the trade of the City. Large camps are being got ready in the Dadar rice fields, most of which area is at present wholesome and suitable. If applications are made to the Secretary to the Plague Committee sheds will be reserved and handed over at cost price. Negotiations are also in hand to secure cheap or free workmen's trains. The site of the camps is close to the Dadar Station and the inmates would probably enjoy good health.

III. If Dadar is too far for working men there is an admirable site at Sewri, and also good sites on Port Trust land near Narielwadi.

IV. If arrangements can be made with the Muccadums or other organisers of labour I think camps for 500 to 1,000 persons could be got ready in 10 to 15 days; cost price being paid for the huts and the Committee arranging for water and sanitation.

V. I am hopeful that many Marathas and other labourers will be found ready to take advantage of these arrangements.

VI. The Committee consider the planting out of the working classes in the fields a matter of great importance and are ready to take any steps to encourage such settlements.

BOMBAY, *15th February* 1898.

F (1).

Rules for Passes to Travellers leaving Bombay.

With the following exceptions, no passes will, from this date, be issued by the Plague Committee unless the applicants have stayed in a Detention Camp appointed by the Committee for a period not exceeding ten days immediately preceding the date of the pass :—

Exception (1).—Those persons who reside in parts of the city believed to be uninfected.

Exception (2).—Those persons with regard to whom the District Medical Officer certifies—

(*a*) that they have been under his supervision for a period not exceeding ten days immediately preceding the date of the application.

(*b*) that, to the best of his belief, there has been no plague in the dwelling occupied by the applicants or in its immediate vicinity for a period of not less than one month immediately preceding the date of application.

Exception (3).—Persons leaving Bombay on business and returning within a week, if living in uninfected localities and on producing certificates of good health from the Medical Officers in charge of the Committee's Camp at Wari Bunder or Modikhana, will, with the approval of the Committee, be granted passes for return to Bombay within seven days.

NOTE.—All persons travelling from Bombay without passes are certain to be detained.

BOMBAY, 21*st January* 1898.

F (2).

Resolutions *re* Sion and Mahim Causeways.

December 1897.

At a meeting of the Plague Committee held on the 4th instant, the following Resolutions were agreed to in regard to the Sion and Mahim Causeways :—

A census of the daily passengers passing through to be completed for a week.

2. On the completion of the census monthly passes to be given by the Chief Medical Officer of the Inspection Staff at certain hours.

3. After the 15th December, all persons not possessing passes to be quarantined or not allowed to pass through.

4. Persons leaving Bombay and intending to return to be given a token at the Causeway on payment of 2 annas which will be returned when the token is given up.

F (3).

Rules for Detention of Passengers from Infected Areas.

1 Third class passengers from infected villages, towns, groups of villages, sections of districts, districts, collectorates, or states shall be detained on arrival in Bombay for a period not exceeding seven days.

2. First and second class passengers will usually be exempt from detention. But the Inspecting Medical Officers are empowered, at their discretion, to detain such persons from infected areas travelling by first or second class, especially such as they may reasonably believe would usually travel third class.

NOTE.—This would include, for instance, those persons who, in order to evade detention, change from third to first or second class at an intermediate station.

3. Surveillance passes may be granted to applicants of assured respectability and position, and provided that the headman or one of the leaders of the community or communities to which such persons belong (on direct personal knowledge or after special satisfactory inquiry) stands surety for them and undertakes that they will return to the camp for medical inspection when, and as often as, they may be required to do so; and provided also that such persons show no suspicious symptoms. If inmates let out of camp on surveillance fail to appear and produce the members of their party at any of the times appointed by the Chief Medical Officer of the camp, the sureties of such inmates will be posted as defaulters, and the continuance of the concession of surveillance will be endangered.

It follows that all leaders should take such zealous and intelligent interest in each candidate as to prevent the risk that the candidate will incur on failing to carry out his undertaking, and the surety, equally with the defaulter, be involved in disgrace attendant thereon.

4. In accordance with Government Resolution No. $\frac{5391}{5416}$ P., dated 5th October 1897, Government officers on duty and their servants shall be passed without detention, provided they shew no signs of illness.

5. Holders of certificates from Plague Authorities or Authorised Medical Officers in infected areas, stating bearer to be free from exposure to infection for a period of ten days immediately preceding his departure, will be exempt from detention.

6. Servants of any European or leading Native will be exempt from detention under the following conditions :—

(*a*) The holding of a certificate in accordance with Rule 5.

(*b*) The holding of a certificate from the Secretary of the Bombay Plague Committee to the effect that the traveller has agreed—

(1) To have all servants placed under medical supervision at his house for ten days after their arrival in Bombay.

(2) To have their clothes washed and disinfected within 24 hours after arrival in Bombay.

NOTE.—Such certificate should be shewn to the Medical Inspecting Officer at the Railway Station and retained by the holder.

DISINFECTION.

7. The clothes and baggage of those detained in camp must be subjected to thorough disinfection before the owners are discharged from the camp.

At the discretion of the Chief Medical Officer of the camp, unclean persons shall be bathed in a disinfecting fluid.

8. Rations to the value not exceeding 4 annas per diem will be supplied by Government to such persons as depend on each day's wage for a livelihood and whose savings do not represent more than a few days' sustenance. But those who are capable of paying for their own subsistence will be required to do so. With these objects a shop supplied with the necessary articles will be maintained within the camp.

F (4).

Notice to the Public *re* Surveillance Passes.

CIRCULAR.

BOMBAY, 20*th October* 1897.

The Committee are desirous of meeting, as far as possible consistent with safety, the wishes of the different communities in regard to the issuing of the surveillance tickets, but it has been noticed that several heads of castes and leaders are in the habit of standing surety for large numbers of these caste-people daily. When the Committee introduced the concession of surveillance certificates, it was with the object of liberating well-to-do merchants and their families, to whom quarantine was especially irksome, and persons whose presence was urgently necessary in the city. So far people have answered to their surveillance fairly well, but there is an inclination to avoid it, and the Committee desire to draw the attention of the heads of communities and others who are standing surety to this notification, that, should persons not return as instructed on the surveillance ticket by the Chief Medical Officer, the permanent pass to the camp and to the gentleman standing surety will be withdrawn, his name will be posted in the camp as a defaulter, and further he will not be allowed to again stand surety for his caste-fellows. It is hoped that leaders of communities will give this matter their careful attention.

F (5).

Notice prohibiting Passage of Suspicious Persons to Malabar Hill and neighbourhood.

Notice is hereby given that by virtue of the powers conferred by Government upon the Bombay Plague Committee, and in particular by notification of Government in the General Department, No. $\frac{5276}{5484}$ P., dated 29th September 1897, published in the *Bombay Government Gazette*, Part I, dated September 30th, 1897, at page 1687, Rule 29 of the General Plague Rules is specially applied to the following local area, *viz.*, those portions of the Island of Bombay known as Walkeshwar, Malabar Hill, Cumballa Hill and Mahalakshmi, which local area is bounded as follows: on the north and north-west by the Sea, on the south and south-east by Back Bay, on the east by the Gamdevi Road, Tardeo Road and Mahalakshmi Road.

By virtue of the said Rule 29, Plague Authorities specially appointed by the Bombay Plague Committee for the purpose are authorised to prevent the passage of suspicious persons and their clothing, baggage, &c., into the local area above defined.

2nd January 1898.

F (6).

Notice prohibiting Passage of Suspicious Persons to North of the Island.

Notice is hereby given that by virtue of the powers conferred by Government upon the Bombay Plague Committee, and in particular by notification of Government in the General Department, No. $\frac{5279}{5484}$ P., dated 29th September 1897, published

in the *Bombay Government Gazette*, Part I, dated September 30, 1897, at page 1637, Rule 29 of the General Plague Rules is specially applied to the following local area, *viz.*, those portions of the Island of Bombay known as Parel, Sewri, Sion, Mahim and Worli, which local area is bounded on the north, east and west by the Sea and on the south by Clerk Road West, Jacob's Circle, Arthur Road East and Kala Chowki Road and Sewri Road to the Sea.

By virtue of the said Rule 29, Plague Authorities specially appointed by the Bombay Plague Committee for the purpose, are authorized to prevent the passage of suspicious persons and their clothing, baggage, etc., into the local area above defined, unless the persons in question are holders of a pass from the Plague Committee.

F (7).

Special Plague Authority for F (6) & (7) preceding.

BOMBAY PLAGUE COMMITTEE OFFICE,

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By order of the Bombay Plague Committee, in exercise of the powers vested in them by Government Notification No. $\frac{5279}{3434}$ P. of the 29th September 1897, it is hereby notified that—

Name_____

Address_____

Description_____

is appointed by the Committee, until further orders, a Plague Authority within the district specified below, for the purposes of Rule 29 of the General Rules under Act III of 1897, printed on the back hereof.

By order of the Bombay Plague Committee,

_____ Chairman.

District_____

Rule 29 *under Act III of* 1897.

Plague Authorities, specially appointed by a Commissioner for this purpose, are authorized to prevent the passage of suspicious persons from any town, village or local area, or into any town, village or local area to which this rule may be applied by the Commissioner, unless such persons have been detained in a place of observation for a period prescribed by the Commissioner, and unless, if arrangements for disinfection of their clothing, baggage, &c., have been made under the Commissioner's orders, such disinfection has been effected. Such Plague Authorities shall have the widest discretionary power, subject to the general or special orders of the Commissioner, to decide what persons shall be considered 'suspicious' for the purposes of this rule. So long as he remains in a place of observation under this rule no person shall be allowed to communicate, except with the permission of the Plague Authority, with persons outside the limits of the place. He shall obey such orders as may be issued by the Plague Authority for the cleanliness or protection from infection of the persons, property or quarters of the persons detained.

NOTE.—This rule was applied to the City and Island of Bombay by Government Notification No. $\frac{5279}{3434}$ P. of the 29th September 1897, and the words "the Committee" should be read for the words "a Commissioner" or "the Commissioner" where such words occur in the rule.

APPENDIX No. 4.

Notes on Disinfectants.

In September some correspondence took place on the several disinfectants in use, as respects their relative cost, efficacy and ease of application. On the last point the Committee were of opinion that the directions for use by them on April 2nd, and published in their Report for 1896-97, fulfilled all purposes. However, as it seemed evident that the solution of perchloride of mercury in disinfecting work was often very incomplete, a circular was issued, requesting all District Medical Officers to, as far as possible, endeavour to make a saturated solution according to the accompanying formula :—

Perchloride of mercury,	480 grains,
Chloride of ammonia,	480 grains,
Glycerine,	12 fluid oz.,
Rectified spirit,	8 fluid oz.,
Water,	5 pints,

making a solution of about 1-100.

An improved method of making this solution, which saved both the rectified spirit and the glycerine, was proposed by Dr. Maitland Gibson a few days later and circulated to Medical Officers. Dr. Gibson's formula is subjoined :—

1 Gallon { Perchloride of mercury, 10½ oz.
Chloride ammonia, 7½ oz.
Dissolve in 5½ pints of water.

Add 48 oz. of strong commercial hydrochloric acid.

These quantities are sufficient to make 64 gallons of 1-1000. Wooden buckets only must be used.

A memorandum on disinfectants was communicated to the Committee by Dr. Collis Barry, the Chemical Analyser to Government, who had made a series of experiments, especially on the proper use of perchloride of mercury.

Memoranda of Solutions.

The following are standard solutions :—

(1) Solution of hydrochloric, 1-1000.

$Hg. Cl_2$, ½ oz.,
Hcl., 1 oz.,

distributed with three gallons of water (1 bucket). The $Hg. Cl_2$ will dissolve the hydrochloric acid in the above proportions, if pure. If impure, there will be a sediment. It should be coloured with methylene blue, and stacked for daily use, labelled "Poison."

(2) Solution of carbolic acid, 5 per cent.
Crude carbolic acid, 24 lbs. Water, 96 gallons.

(3) Solution of pot. permanganatis, 1-60.
Pot. permanganatis, 16 lbs. Water, 96 gallons.
Adding 6½ lbs. Hcl. to increase efficacy.

(4) Phenyle emulsion, 1-20.
Phenyle, 24 lbs. Water, 96 gallons.

(5) Solution of fornalin (commercial), 1-400.

Dr. Collis Barry strongly advocated the use of the last solution as cheaper than Hg. Cl_2, and non-poisonous. A solution, 1-1000 of formic aldehyde, being as powerful as 1-1000 of Hg. Cl_2, 1-400 of fornalin would answer the same purpose, in his opinion, as well or even better, being free from danger. However, its action was considered uncertain so far as yet ascertained, and it has the disadvantage of being unstable. The efficacy of chloride of lime and sulphur as disinfectants are very slight.

In the months of October and November 1897, the Committee received intimation that some of the disinfectants were of inferior quality, and analysis of samples by Surgeon-Major Bannerman and the Chemical Analyser to Government were at once obtained. Frequent precautions were taken to prevent fraud in this way.

In some of the camps masonry tanks were erected for the disinfection of clothes, &c., by means of strong solution of the stronger disinfectants, but the method is cumbersome and unsatisfactory, and was supplanted as soon as possible by the steam sterilising apparatus.

The following notes on the preparation of solutions of Perchloride of Mercury were specially written for this report by Dr. Haydon, M.D., D.P.H.

It is now generally accepted that, for practical purposes, perchloride of mercury is the most powerful disinfectant known and that its efficacy is markedly increased by the addition of an acid, preferably hydrochloric acid.

The acid prevents the precipitation of the mercury, in the form of insoluble and practically innocuous albuminates from albuminous material so constantly present in polluted soils of dwellings and filthy rooms.

Owing to the somewhat difficult solubility of the mercury perchloride, it is desirable to issue this disinfectant ready dissolved, so that only the addition of a predetermined quantity of water is necessary.

For convenience of transport, therefore the preparation of highly concentrated solutions becomes of some importance.

In order to obtain these concentrated solutions, the addition of certain salts is necessary to increase the solubility of the mercury perchloride. The salts most commonly used for this purpose are common salt and ammonia chloride.

Hydrochloric acid also increases the solubility of the perchloride to a slight extent, but the primary use of the acid is to enhance the efficacy and not the solubility of the perchloride.

Common salt has the advantage of cheapness and of being generally obtainable, but, if possible, I prefer to use ammonium chloride as concentrated mercuric solutions prepared with common salt are precipitated on the addition of hydrochloric acid. This precipitate, however, is readily soluble in water, and if the precaution be taken of shaking up the contents and thoroughly rinsing out the bottles in which the strong solution is supplied, there is no objection to the use of common salt.

After numerous experiments I found the best results were obtained by adding one part in four of ammonium chloride or common salt to the mercuric perchloride.

The salts are to be ground up finely and thoroughly incorporated in a porcelain mortar, as this greatly lessens the time required for solution.

A measured volume of water equal in weight (3 for 3) to the weight of mercury salt is now added, and the whole gently warmed. Boiling is not necessary, the whole of the salts passing into solution at a temperature of 103° F.

The result is a cent per cent solution of mercury perchloride, which does not crystallize out on standing, at ordinary Indian temperatures at least.

It is important to remember that in the process of solution a considerable expansion takes place in the bulk of the fluid.

Thus though 2½ pounds weight of the resulting fluid contains one pound weight of mercuric perchloride, it measures 22 fluid ounces if freshly prepared and warm, or 20 fluid ounces if the solution has been allowed to cool before measuring.

In practice I have been in the habit of measuring 5½ oz. (5¼ cool) into an ordinary wine bottle and filling up the bottle with concentrated commercial hydrochloric acid. The bottle, then contains 4 oz. by weight of mercury perchloride, and 20 fluid oz. of hydrochloric acid, and its contents are sufficient to prepare 25 gallons of disinfecting fluid containing—

Mercuric perchloride, 1—1000.
Hydrochloric acid, 5—1000.

This proportion of acid has been found to give the best results.

If it is desired to prepare smaller quantities of disinfecting fluid, the contents of the bottle are thoroughly shaken up, and 1 oz. added for every gallon of disinfecting solution required.

For the preparation of the concentrated mercuric solution, any glazed porcelain or earthenware vessel may be used; and this may be conveniently covered outside with clay and built into an ordinary clay fireplace. The contents may then be ladled out with a porcelain or wooden dipper. It cannot be too strongly or too frequently reiterated that no metal vessels, &c., are to be used in the preparation or application of this mercuric solution. Even enamelled iron vessels are rapidly corroded by mercuric solution of slight concentration.

APPENDIX No. 5.

Steam Disinfectors.

The ancient methods of disinfecting such articles as clothing and bedding by exposure to the sun or immersion in a solution of perchloride are somewhat crude and haphazard, and when large crowds are daily entering a camp, such methods require a large staff of attendants, and lead often to much confusion and loss.

Steps towards a thorough system of scientific disinfection by sterilisation by means of steam under pressure were, therefore, taken by the Committee, and for a commencement the equifex disinfector belonging to the Port Health Department was obtained and installed at Wari Bunder Camp.

Another and a somewhat larger equifex disinfector was then purchased from the P. & O. Company at a cost of £300, and was erected on the open ground to the west of the Modikhana Camp under a suitable permanent iron-framed building, 19ft. × 45ft., covered with corrugated iron sheets. It is described as "an equifex steam disinfector under the Genishe and Heischer Patent, manufactured by Messrs. J. Deffris & Sons, London, size 7 ft. × 4 ft., complete, with an 8 H. P. vertical boiler and all necessary fittings."

The land on which it was erected is held on a monthly tenancy, and the shed has accordingly been constructed so as to allow of its removal elsewhere, if required, at a small cost.

In regular work the following establishment would be necessary :—

	Rs.	a.
1 Inspector on Rs. 75 per mensem	75	0
1 Third Class Certificated Engineer on Rs. 25 per month	25	0
1 Coalman and 2 coolies on Rs. 12 each per month ...	36	0
1 Ramosee on Rs. 11 per month	11	0
Rs.	147	0
Coal, 5 cwts. per day, at Rs. 20 per ton	150	0
Water, 1,000 gallons per day, at annas 10 per 1,000 gls.	18	12
Stores and repairs, at Re. 1 per diem	30	0
Rs.	198	12

The machine at Wari Bunder required the same establishment and stores, being of the same type and construction in all respects, except that it was mounted on wheels. A third disinfector was constructed to the orders of the Committee by a local firm, Messrs. Richardson & Cruddas, at a cost of Rs. 2,200, and was installed at the Nairelwadi Camp.

A fourth, *viz.*, an equifex horizontal disinfecting stove, of the Genishe and Heischer Patent, was placed at the disposal of the Committee by the Surgeon-General with the Government of Bombay, and was erected at the Byculla Camp, but was soon again removed to Karachi on the reappearance of Plague at that port.

As it was not possible to provide each of the remaining camps with a steam disinfector, the following arrangements were made for dealing with the kit of persons sent to camps in which no steriliser was at work :— The kit of each person was overhauled, and such articles of wearing apparel as would not take harm by being steamed in the steriliser, and all bedding, was packed into a numbered bag and securely tied and sealed with a small lead seal in the presence of the owner ; a token stamped with the same number as that on the bag was then given to the owner of the kit, and the bag was sent to the nearest disinfecting yard, disinfected and returned to the owner without being opened. This arrangement was viewed with great favour by the people who were satisfied that they would get their belongings returned to them intact. At the same time the ordinary camp establishments found the packing, lacing, and sealing somewhat elaborate, and the system was regularly carried out only in the Kennedy Seaface and Goculdas Camps under Major Ross.

Disinfector's action.

The first condition of a good steriliser is that it should withdraw the air from the innermost recesses of bulky articles under treatment. The mere admission of compressed steam forces the air into these without withdrawing it, in consequence of which the steam is prevented from entering to any depth.

In the equifex, perfect steam permeation is effected by cutting off the steam supply to the inner chamber after the requisite pressure has been exercised for a short time, and then causing a certain reduction in pressure by the quick discharge of a portion of the contained steam. Hence, a sudden expansion and withdrawal of the compressed air in the inner folds of the articles, and its discharge into the atmosphere with the steam. After three or four repetitions, it is found that

the steam has penetrated everywhere. In the Lyon's machines the air is withdrawn prior to the admission of steam by the production of a vacuum.

Drying is effected by allowing the exhaust valve to remain open and turning steam into a ring between the inner and outer casings. This forms a steam jacket which evaporates all moisture contained in the treated articles—a process assisted by the admission of air from a valve at the bottom of the chamber, while a small ejector in the exhaust-pipe keeps up circulation.

The action of the machine constructed by Messrs. Richardson & Cruddas is somewhat different. Its working was tested by Mr. Hewett, the Assistant Executive Engineer, Municipal Workshops, who reported that the means taken to get rid of the contained air in the chamber and to secure a thorough penetration are as follows :—" On the admission of steam from the outer to the inner casing, or, in other words, from the boiler to the disinfecting chamber, the pressure in the latter rises to 6lbs., corresponding to a temperature 230° F. When this pressure is attained, a safety valve in communication with the chamber and loaded to 6lbs. comes into action, and allows all surplus steam to blow off into the atmosphere. As the boiler continues to generate steam, a current of steam at the above pressure is continuously passing through the chamber. This action appears to secure thorough penetration of all articles, for on wrapping my handkerchief tightly up inside a blanket, and afterwards withdrawing it from the chamber before the drying operation was commenced, it was found to be quite damp and hot. In regard to the drying of the articles after treatment, I find that the apparatus is as quick, if not quicker, in action than the equifex disinfector. This is attributed to the fact that, although the steam pressure used is very much less than in the equifex apparatus, the heating surface is much greater, and the few clothes treated in my presence were found to be practically dry after five minutes treatment."

The cost of working this disinfector is somewhat smaller than that for the equifex, and is estimated to be Rs. 200 per mensem. Its prime cost is about Rs. 2,000, something less than one-third the cost of an equifex.

APPENDIX No. 6.

Rats.

Whether rats bring Plague from infected into uninfected localities, or whether local rats are the first victims to existing local infection, has not been determined. It seems almost certain that, in some instances, rats suffering from Plague have moved in numbers to a fresh locality, and have brought Plague among the people there. In other instances the evidence seems to show that local rats sickened in consequence of the introduction of infection by human agency. In either case the certain and close connection between sick rats and Plague is beyond question; and the sequence is almost invariable that, unless disinfectants are freely used, Plague among rats is followed by Plague among men. It was the hope of the Committee to devise some organization by which rats could be killed in large numbers. High rewards, as much as one anna a rat, were offered, and the necessity of inducing people to kill rats was impressed on all Plague officials. The idea of bringing Wadars or other Deccan rat-catchers to work in Bombay was suggested, but had to be abandoned. The Wadars and other upcountry rat-catchers work in open fields driving the rats into the centre of the rat warrens, and there securing them in large numbers. The stone pavements in Bombay made the tools and the methods of the upcountry rat-catcher useless. Again it was thought that among British soldiers a certain number of skilled rat-catchers might be found. This attempt also failed. Finally, Bombay native rat-catchers were engaged, but with no satisfactory result. The only course that remained was to continue the existing practice of special care in obtaining news of sick rats, and in opening the drains, closing and disinfecting the rat-holes, and disinfecting the rooms and the surroundings of any house in which sick or dead rats were found.

Dr. Lewis Godinho, the District Medical Officer, gives the following details of his experience in C Ward, both during the first and during the recent epidemic:—"Sick rats are generally found in a locality from eight to twelve days before the first case of Plague occurs among men. Plague-stricken rats give out a musky odour and rapidly develop buboes. They move about listlessly in back gullies, sinks, and bathing-places. After two days they cease to be able to move. Local rats may sometimes be infected by imported Plague. As a rule, the rats seem to carry the Plague moving from south to north, and, less regularly, from east to west. In

the previous epidemic sick rats were found in houses at the south end of Khoja Street in Khara Talao. For a time all the houses infested by sick rats were on the same side of the street. They were next found on the other side of the same street, but always in houses further north than those they had left. In the present epidemic, towards the end of February (1898), sick rats were found in Dukar Gully in Phanaswadi. They made their appearance on the ground floor of the houses at the east end of the gully, and then rapidly travelled towards the west end, keeping to the rear gullies where water could be easily obtained. About a week after the appearance of sick rats, the inhabitants of Dukar Gully began to sicken and die of Plague. The first cases happened in houses where dead rats had been found. From Dukar Gully rats travelled west to Burrow's Lane. A listless rat was found on the 5th of March in No. 3, Burrow's Lane, and eight days later a servant boy, who is said to have killed and burned a rat, was attacked with Plague."

Dr. Hornabrook, M.B., M.R.C.S., has noted the following seven instances of the finding of dead rats in houses during the recent epidemic in C Ward:—

1. In No. 2, Kumbharwada Street, in the middle of February 1898, dead rats were found previous to Plague cases.
2. In No. 29, Kolbhatwadi, dead rats, in an advanced stage of decomposition, were found at the same time as a Plague case.
3. In No. 3, Kalbadevi Road, inhabited by Europeans, dead rats were found three to four days before a case of Plague occurred among the native servants.
4. On February 20th, 1898, in No. 273, Kalbadevi Road, 20 dead rats were found in one room. The house was disinfected and limewashed, and no Plague cases occurred.
5. In No. 39, First Marine Street, ten dead rats were found. The house was disinfected and limewashed, and no Plague cases occurred.
6. In No. 8, Phanaswadi Cross Lane, Room No. 1, dead rats were found. The house was disinfected and limewashed, and no Plague case occurred.
7. In Diva's Chawl, Trinity Street, dead and dying rats were found. A Plague case occurred in the same chawl a few days later.

Dr. Shroff, on 20th April 1898, reports that on Malabar Hill dead rats were found only in the servants' quarters of three bungalows close to the sea on Nepean Sea Road and Warden Road. In his opinion these diseased rats came from other infected districts, and travelled by night, as only in the morning were dead rats found. In rooms where dead rats were found, even though the rooms were carefully disinfected, the inmates were attacked with Plague.

The outbreak of Plague in Fort North was accompanied by the appearance of sick rats in Carwar Street, Mint Road, and the by-streets, and for some considerable time almost daily reports of dead and dying rats were received from various parts of the Fort.

The following is a list of places in which rats were found dead or dying for some three weeks in the winter in the Fort only :—

Elphinstone Circle.	47, Hornby Road (Oriental Buildings).
Customs House.	45 & 84, Hornby Road.
Dean Lane.	Hornby Road.
Hummum Street.	30 & 33, Frere Road.
Medow Street.	Green Street.
Carwar Street.	Grant Road Buildings.
Goga Street.	37 & 67, Esplanade Road.
Mint Road.	Forbes Street.
17, Military Square.	Tamarind Lane.
7, Barber Lane.	Cawasji Patel Street.

APPENDIX No. 7.

Inoculation.

The attitude of the Committee as regards the prophylactic inoculation advocated by M. Haffkine, C.I.E., has been the subject of considerable criticism and condemnation in the public press.

The subject was thoroughly considered and discussed, and a resolution was finally adopted, excluding the measure as not being one of those that should be worked by the Committee.

It was considered that inoculation could not, as a means of suppressing the disease, take the place of segregation, disinfection of houses, and removal of persons from infected localities.

The Committee had all along been engaged with operations of an administrative nature in obedience to the principles laid down by Government for combating Plague, and neither they nor their officers had much opportunity of inquiring into the scientific aspect of this question or of putting it to that severe test of investigation and inquiry which its importance rendered necessary. In fact, beyond certain published records, the barest information has been obtained directly by the Committee, and latterly this experience has been limited to notes on a few cases in the Khojah Hospital, in which doubts were thrown upon the efficacy of inoculation. The cases were six in number, of which five were fatal; and the periods which had elapsed since inoculation varied from eight days to six months.

The notes and report were sent to M. Haffkine for the favour of scrutiny, and his reply was as follows:—

"It appears that three of the persons believed, by the Medical "Officer in charge of the Mahomedbhai Ebrahim Hospital, to have been "inoculated, have not been inoculated. These are Tejbai Mahomed, "Umerbai Karamally and Shakahaibai Ahmed, who all succumbed to the "Plague in the above hospital between the 5th and 16th January 1898.

"The information concerning the fourth patient, Halimabai Allibhoy, "said to have been inoculated twice in Poona, and who afterwards passed "through a rapidly subsiding attack of Plague in the above hospital, "could not be verified for the present, as the documents concerning the "Poona inoculations have been placed in charge of the Poona Plague "Committee. The remaining three patients were actually inoculated;

" one Gulam Hoosein Meherally on the 21st April, 8½ months before the " attack ; another Mahomed Visram, who died nine days after the inocu- " lation, is stated to have been already unwell at the time of inoculation, " and felt pain in the gland on that day ; and the third, Hoossein Allimiya, " whose disease took a favourable turn from the next day after admis- " sion, was inoculated ten days before."

It is acknowledged by the Committee that the inoculations may be protective for a certain period—the duration of which is unknown—and M. Haffkine's figures seem to show that they are successful ; but it is impossible to make such prophylaxis compulsory, or to make it keep pace with the spread of Plague.

Under these circumstances, it did not seem desirable for the Committee to inaugurate and take part in the introduction of inoculations, which could only be properly done by the formation of a specially trained staff, separate from the general staff on which the Committee depended for the due performance of those duties, which, in the opinion of the Committee, were of paramount importance. When, soon afterwards, the Municipality took up the subject and opened stations for voluntary inoculations in different parts of the City, a question, which was bristling with doubts and difficulties, was solved in a way which undoubtedly produced the maximum of good and the minimum of friction.

APPENDIX No. 8.

NOTES ON SOME BACTERIOLOGICAL OBSERVATIONS MADE IN THE GRANT ROAD LABORATORY

BY

Dr. L. G. HAYDON, M.B., D.P.H.,

AND

Dr. F. M. GIBSON, M.B., B.Sc.

A series of experiments were made with the object of ascertaining, as far as possible, how the specific contagion of the disease passed from man to man, from rat to rat, or from rats to men; and, secondly, the relative degree of infectiousness in the dead as compared with the living.

While these experiments were in progress, some information was also gained on other points, hereafter enumerated.

Blood, excretions, and secretions were systematically examined, both from men and rats that had died of Plague. The presence of innumerable bacterial forms in such material, many of them bearing a strong resemblance, both microscopically and culturally, to the Plague organism, adds very largely to the difficulty of such an investigation, and renders it imperative, that no organism should be declared to be the Plague bacillus until it has been isolated, grown pure, and shown capable of *reproducing* the same disease.

The following methods were adopted to obtain the materials for examination :—

IN MEN DEAD OF PLAGUE.

Blood from the lungs and extremities was obtained by a sharp, pointed, sterile, capillary pipette, thrust through sterilised areas of the skin.

Urine, or, more properly speaking, fluid expressed from the urethra was drawn in small quantities by sterile pipettes from the urethra.

Fæces from rectum by a sterilised glass rod.

Sputum from fauces by swabs of sterile cotton wool.

Tears and sweat were not examined, but it is extremely improbable and contrary to all previous experience that a bacillus could be excreted in the latter.

IN RATS DEAD OF PLAGUE.

Blood was obtained from the snipped-off tip of the tail, the lungs and the spleen.

It may be here remarked that we never failed to obtain a pure cultivation of the germ from the extreme tip of the tail, and this can be so readily snipped off, squeezed and pressed on to a slide that it forms a very rapid and safe method for the diagnosis of Plague-stricken rats which are so frequently the forerunners of an outbreak.

Urine—Obtained by expressing the contents of the bladder "per urethram" after sterilising the outlet with a hot glass rod. This was found to be the most reliable method, as incisions through the bladder wall might permit the admission of Plague organisms from the blood.

Fæces—Obtained on a platinum loop after scorching a hole through the intestinal wall.

Sputum—By swabbing the fauces.

In the Blood—Plague bacilli were found in all cases *in men and rats* dead of Plague, but in the blood of rats they were, as a rule, far more abundant.

In Liquid drawn from Urethra—Plague bacilli were demonstrated both in *men* and *rats*.

In Fæces—They were found in rats, but not *up to the present* in men.

In Sputum—It was always found in Plague pneumonia cases, but in ordinary cases we have failed up to the present to isolate it. By Plague is *not* meant the secondary pneumonia which is so common a complication of the bubonic type, but a pneumonia which is the *first* and predominant feature of the disease.

The above experiments, although their number so far is too limited to justify a rigidly definite statement, go towards showing that most of the principal excretions are the means of transmitting the disease from the dead to the living, both as regards men and animals.

INFECTIOUSNESS OF THE LIVING.

This leads up to the question as to the length of time before death that these excretions become a source of danger.

In man this time is apparently very short. We have repeatedly failed to find the bacilli in the blood even three or four hours before death, from which it may be inferred with tolerable certainty that it is absent from the excretions also until a very short period before death.

(Plague pneumonia is a notable exception, the bacillus being present in the sputum at an early stage.)

In short, the organism seems to be confined to the bubo until shortly before death, and it is only then that it gains an entrance into the blood stream, and becomes rapidly and widely disseminated in the tissues and in the excretions, which one so constantly sees dribbling away on to the floors and bedding in moribund cases.

Hence, in the interests of the living, a strong argument can be deduced for the compulsory removal even of these moribund cases.

INFECTIOUSNESS OF CONVALESCENT CASE.

Examination of blood, and pus from buboes which had opened naturally or been incised, gave *negative* results, and it therefore seems unlikely that the organism can be present in the excretions of such cases.

VITALITY.

As to the vitality of the germ under laboratory conditions, it was found that cultures grown for 57 days in one tube, and then transplanted, flourished, and were capable of producing fatal Plague in rats, although the incubation period was much longer than for more recent growths.

INCUBATION PERIOD.

The usual period in rats was found to be from two to three days. In the above case the period was seven days. Rats kept in cages in which inoculated rats had just died of Plague did not develop the disease.

All attempts to isolate the organism from the floors of infected dwellings or soil gave negative result both by plate cultivation and inoculation.

Bacilli, closely resembling it both microscopically and in their growths, were found, but did not stand the final test.

Rats inoculated with polluted soil generally died, but not of Plague.

Examination of the organs reveals the fact that malignant œdema is usually the cause of death.

If, however, Plague bacilli have been purposely added to the soil used, the rat dies of a mixed infection; but the Plague bacilli can be readily isolated from the organs, because the bacillus of malignant œdema dies out at once in aerobic cultivations and leaves the Plague pure.

This method, therefore, of detecting the germ in the soil seems a promising one to pursue, provided always the real cause of death is scientifically ascertained.

Experiments are also in progress to find out the vitality of the germ in sterile and polluted soil respectively.

APPENDIX No. 9.

EXPLANATION OF MAPS AND CHART.

MAP No. 1.

Map No. 1 shows the sub-division of the Island into Wards and Sections, and in the marginal squares, the names of the officers in charge of the same.

The colouring on the plan of the wards, agrees with the marginal squares, and within the squares are given the names of the Sections, the population, and the number of houses in each Section.

A Plague Committee Hospital is shewn by a circle coloured yellow, with a number in the centre of it. On a reference to the index at the side of the map, the name of the Hospital referred to is given. The Committee's Health Camps are shewn by a red circle, with a number. A similar index at the side of the map gives the name of the Camp.

The small pink squares with numbers, indicate the position of the Private Hospitals, and the index at the side of the map gives the names and the Sections in which the Hospitals are situated.

MAP No. 2.

Explanation of Map. Map No. 2 is an epidemic map of the disease, showing its course from September 1897 to the end of March 1898.

Primary Colours. The primary colours have been made use of in this plan in their regular order, as shown by the large coloured circles in the margin, month by month, and this has been continued after the 7th month by using the colours again and hachuring the circle.

In the margin are also shown all the Census Sections of the city.

Sections. Each Section, as it became epidemic, was coloured with the colour distinguishing the month in which the disease arrived at the epidemic stage, and under each marginal Section heading is shown the number of cases taking place monthly in that Section, after the disease had become epidemic.

Epidemic. In deciding on the epidemic state of a Section, great care was taken to carefully watch the distribution of the cases throughout the Section, and this was done in many instances by plotting on a plan the actual cases from house to house. It has often occurred in this city that Plague has raged in an epidemic form in small and confined areas, especially those inhabited by Kolis (fishermen), while beyond such areas it has only appeared in a sporadic form. In such cases the whole Section was not considered epidemic. Previous to, and after the epidemic period, cases appertaining to the month in which they occurred are shown by coloured circles placed in the Section, according to the monthly colour; the number of cases shown in the circles indicates the number occurring in that month.

A similar plan was prepared for the first epidemic and attached to the first Report of the Bombay Plague Committee.

On referring to that plan it will be seen that the epidemic area in 1896-97 is much smaller than in 1897-98.

It may also be noticed that the first Section to become epidemic was Dongri in January, a month later than in the previous epidemic, and the same will refer to all the other Sections.

Up to the end of March 1898, 24 Sections only out of 32 had become epidemic, pointing to the fact that the measures taken had the effect of keeping the disease within a much smaller area than in the epidemic of 1896-97, when 31 Sections were epidemic. Again, up to the date to which the chart is compiled, there has been no recrudescence in any Section, which was not the case in 1896-97. The following conclusions may probably be inferred from the readings of the chart as to the effect of the measures taken :—

(1.) The epidemic area of the disease reduced in 1897-98 in comparison with 1896-97.

(2.) No recrudescence in any of the Sections, such as occurred in 1896-97.

MAP No. 3.

MEMORANDUM on Mortality Chart from 1st June 1897 to 30th April 1898 by PLAYFORD REYNOLDS, Esq., C.E., Superintending Engineer, Bombay, P.W.D.

Mortality Chart Plan No. 3.

This chart is a continuation of that shown as Plan 3 attached to General Gatacre's report, with the addition of arrow heads indicating wind directions, extracted from the daily meteorological reports as follows :—

Maximum and minimum temperatures	shown by thick *black* lines.
Population	„ a thin *blue* line.
Humidity	„ a *green* line.
Daily mortality	„ a thick *red* line.
Normal mortality, average of the 5 years previous to plague	shown by a thin *red* line.
Velocity of wind	„ *purple* line.
Wind directions...	„ arrow heads.
Clouds	„ a *brown* line.

Scale.

The horizontal scale is six days to an inch ; the vertical scale varies, as shown in the left hand margin.

Information obtained.

The information in the chart has been obtained as follows :—

Temperatures, humidity, wind velocities and *clouds*—from the records of the Colaba Observatory.

Wind directions—from the daily reports by the Meteorological Reporter, Western India.

Population—from the Managing Director of the Tramway Company, based on average tramway receipts for several years, checked with information published by the Bombay Chamber of Commerce. These returns, from independent sources confirmed by the Plague Committee's observations, may be taken as fairly correct.

Daily mortality—from cemetery returns of the Municipal Health Department.

Normal mortality—the average of the five years previous to the outbreak of the Plague from the returns in the *Government Gazette*.

The *red* figures at the top of the chart are the total deaths from all causes during each month, and the *red* figures below are the total deaths from Plague; deaths from cholera are shown in *black* figures under the Plague totals.

Plague deaths.

The total number of deaths from Plague has been arrived at in the following manner :—

The total weekly average number of deaths during the five years previous to the Plague has been deducted from the total deaths from all causes for the week, and the remainder taken as the number of deaths due to Plague, deaths from cholera being shown separately. But owing to the decrease of population, there must be added, in order to arrive at a true conception of the increased mortality, a figure bearing the same proportion to the recorded deaths as the calculated actual population bears to the normal population of 850,000. This calculation has been made, and the figure or number to be added is given in *red* figures above the numbers for *estimated* deaths from Plague by months, entered at the bottom of the chart.

Object of compilation of chart.

The object of the compilation of this chart was to establish the truth or otherwise of some of the theories freely advanced regarding the definite influence of temperature, humidity, wind and clouds on mortality. No more definite connection is evident from the records than was the case last year (see marginal quotation from last year's report), and most, if not all, of these theories must for the present be abandoned.

Northerly and easterly winds, which are always dry, seem generally to have had an unfavourable influence, often immediately so, on the mortality, *e.g.*, after October, *i.e.*, from November to near the end of March (when the humidity was only on four days above 80 and generally between 60 and 70 and while easterly winds prevailed) the mortality increased irregularly but more or less steadily; and in particular cases, *e.g.*, on 8th and 9th February and on the 2nd March, when high winds were accompanied by a fall in the humidity, there were immediate increases in the deaths as shown in the chart.

There has not, however, been a sufficiently consistent sequence to make any generalisation possible, and as a matter of fact, in order to give the elements a fair chance, all Plague measures should be abandoned, for it cannot be doubted that the measures that have been adopted have had the effect of diminishing the extent of the pest. The degree of sanitary efficiency is also a disturbing factor.

Advent of the rains.

The records of 1897 show that the advent of the rains may be looked to with the confidence that this year again the Plague death returns will be very low during the monsoon; and the returns for April make this assurance doubly sure.

APPENDIX NO. 10.

A List of Members of the Local Committees.

A WARD.

COLABA.

Mr. P. David.
„ Munshi Fariduddin.
„ G. M. Fernandez.
„ Mahomed Sendole.
„ Gopal Patel.
Mr. Harrichander Vishram.
„ Sorabjee Machliwala.
„ K. R. Cama, J. P.
„ Merwanjee Colabawala.
„ J. J. Mody, J. P.

FORT.

Mr. M. M. Murzban.
„ Bomanshaw Entee.
Dr. J. J. Cursetjee.
Mr. R. J. Tata.
„ S. E. Warden.
„ M. N. Daruwala.
„ Kalidas.
„ Damodar Gwardhandas.
Dr. R. S. Nariman.
„ B. N. Darabsett.
Mr. Hormusji D. Sha.
„ N. N. Gazdar.
Dr. N. N. Katrak.
Mr. Ardeshir N. Gazdar.
„ B. P. Dhondi.
„ B. B. Patell.
Dr. D. N. Saher.
Mr. D. D. Albless.
„ E. W. Slater.
„ F. R. Joshi.
„ R. P. Karkaria.
„ C. E. Howard.
„ C. E. McDonald.

B WARD.

KHOJA CASTE COMMITTEE.

The Hon. Mr. Fazulbhai Visram (Chairman).
Mr. Fazulbhoy M. Chinoy (Secretary).
„ F. O. Ganga.
„ Abdoolla Hoossein.
„ Remtoolla Khairaj.
„ Joosub Peerbhoy.
„ Habibbhoy Cassumbhoy.
„ Mahomedbhoy Vally.
„ Ibrahim Rahimtoolla.
„ Gullamali Mahomed Sajan.
„ Hoossein Joosub.
Mr. Dost Mahomed Allana.
„ Kamaria Ismail Cassum.
„ Moledena Laljee.
„ Mahomed Jaffer Mukni.
„ Joomabhoy Khan Mahomed.
„ Joomabhoy Jan Mahomed.
„ Jaffarbhai Samjee.
„ Dostmahomed Peerbhoy.
„ Sheriff Denjee Kanjee.
„ Cassam Deojee.
„ Mukhi Cassum Mussa.
„ Luhana Carjee.

BENI ISRAIL COMMITTEE.

Mr. David Soloman.
„ E. M. Ezekiel.
Mr. Ezekiel Shalome.
„ Abraham Soloman.

COMMITTEE FOR NORTH CHUKLA & SOUTH UMARKHADI.

Mr. Haji Abdul Rahiman Haji Mahomed (Chairman).
„ Haji Abdool Suttar Haji Oomar (Vice-Chairman).
„ Haji Yasuf Haji Ismail } (Secretaries).
„ Sulleman Abdul Wahed }
„ Haji Jackaria Haji Medina.
Mr. Haji Bachoo Varaya.
„ Haji Haroon Tyab.
„ Haji Jan Mahomed Haji Mahomed.
„ Haji Ismail Allana.
„ Sulleman Haji Ahmed.
„ Ebrahim Haji Haroon.

DONGRI—

Mr. R. S. Vithalrao Krishnaji Vandekar.
„ G. Moses (Secretary).
„ Maneckji Jamsetjee Chandana (Secretary).
„ Balkrishna Bhiwaji (Secretary).
„ Ghamaji Balaji.
„ Alli Mahomed Bhimji.
„ Premji Morarji.
„ Shamji Jivraj.
„ Krishnaji Bapuji.
„ Dapurao Ramji.
„ Moses Elijah.

Mr. Oomersey Nagsy.
„ Mooloo Jan Mahomed.
„ Moolji Noor Mahomed.
„ Shivram Vithal.
„ Mangal Ramji Mhatre.
„ Jairam Madhavji.
„ M. J. Ezekiel.
„ Baba Saheb Buksh Gool Mahomed.
„ David Moses.
„ Balkrishna Janoo Mhatre.
„ Gangaram Vithal Poonekar.
„ Vasantrao Gangaram Kaduskar.

UMARKHADI—

Mr. Ibrahim Rahimtula (President).
„ Joseph Ezekiel (Vice-President).

Mr. Ramchandra V. Vandekar } (Secretaries).
„ Syed Nissar Hoosein. }

(a) North-West Section.

Mr. Najmuddin Tyebji (Chairman).
„ Narayan Hari Surve (Secretary).
„ Mukli Kasam Musa.

Mr. Nanabhai Narsingrao.
„ Samuel S. Mazgaonkar.
„ Mavji Hirji.

(b) North-East Section.

Mr. Mahadev Mukund Savant.
„ Mirza Mahomed Shirazi.
„ Krishnaji Anaji Halde.

Mr. Vasudev D. Bhogle.
„ Sitaram K. Bole.
„ Sakharam Vithal.

(c) Central Section.

Dr. Dosabhoy K. Patel (Chairman).
Mr. Elijah Solomon (Secretary).
„ Hakim Gulam Mohidin.
„ Haji Oomarkhan Haji Yusufkhan.
„ Balkrishna Narayan Pewekar.
„ Bala Miya Mukadam.
„ Shaik Shoba Lala.
„ Syad Baboola Shah.

Mr. Devji Bhikaji Pevekar.
„ Pandurang Parashuram.
„ Syed Hussein Ahmed.
„ Govind Mahadev Sansare.
„ Namdev Dharmaji Chorge.
„ Abdulla Hoosein (Siddi King).
Sophie (the Siddi Queen).

(d) South-East Section.

Mr. Mahomed Shirfuddin Khalil (Chairman).
„ Sale Mahomed Ibrahim (Secretary).
Dr. Ismail Jan Mahomed.
„ Rajabali V. Patel.
Mr. Shahabuddin Kittekar.
„ Haji Abdul Khatif.
„ Baba Saheb Damaskar.
„ Ahmed Saheb Mungay.

Mr. Alli Saheb Baba.
„ Ibrahim Meher Ali.
„ Abdul Reheman Ibadula.
„ Jaffar Mahomed Sajan.
„ Abdul Reheman Premji.
„ Bande Ali Bhoju.
„ Abdul Rehman Kamrudin.
„ Abraham Daniel Pezarkar.
„ Jusuf Jacob.

Kolsa Mohalla—Memonwada.

Mr. Ali Saleh Shaik Abdulla Bahadur.
„ Shaik Hoosein Shaik Abbadin.
„ Mahamadmia Shurfoodin, Patel.
„ Haji Abdoola Khatif, Vice-Patel.
„ Shabudin Kitaker, Vice-Patel.
Mr. Heeraji Allu, Patel.
„ Sugen Kitekar, Vice-Patel.
„ Shaloomia, Patel.
„ Kamal Mookadam, Vice-Patel.

Kolsa Mohalla.

Sirdar Khan Bahadoor Cassam H. Mitha (Chairman).
Mr. Haji Oosman Abba (Secretary).
„ Haji Ebrahim H. Ahmed, Patel.
„ Haji Ebrahim H. Soomar, Patel.
„ Haji Oomar Haji Adam.
„ Haji Jooseb Ebrahim.
„ Noormahomed H. Vally.
„ Hajee Mahomed Haji Dawood.
„ Haji Moosa Adam.
„ Beg Mahomed Abdool Rahaman.
Mr. Haji Mahomed Moosa.
„ Hajee Soomar Kassam.
„ Haji Oosman H. Ganny.
„ Haji Mahomed Abba.
„ Haji Vareen Bawa.
„ Haji Mahomed Essa.
„ Moosa Eyab.
„ Haji Ahmed Oomur.
„ Dada Habib.
„ Ally Mahomed Abba Jooma.
„ Sooleman Hajee John Mahomed.

South Chakla.

Mr. Haji Abdool Satar Haji Oomar Soab (President).
„ Ahmed Dewji (President).
„ Kazy Mahomed Morgay (Vice-President).
„ Ahmed Nakhooda Haji Aruf Bharoocha.
„ Haji Mahomed Ebrahim Jitekar.
„ Ismailji Ebrahimji Kurwa.
„ Sheriff Deoji for Deoji Kanji.
„ Ranchhoddas Vandravandas.
„ Gopaldas Kushaldas.
Mr. Gopal Damji.
„ Harjivan Meghji.
„ M. N. Nicholson.
„ Haji Moosa Haji Sooleman.
„ Haji Cassum Joosub.
„ Ebrahim Haji Mahomed.
„ Adam Latiff.
„ Sacoor Haji Hassam.
„ Latif Salemahomed.
„ Haji Aboo Haji Habib.
„ Haji Sarif Attaree.

Mandvi.

Mr. Curumsey Damji (President).
„ Keshavji Nathoo Sailor (Vice-President).
„ Mulji Nathoo (Secretary).
„ Purushottum Ratansi Khimjee.
„ Meghjee Vallabhdass.
„ Vaghjee Beehar.
„ Arjun Khimjee.
„ Keshavjee Kuvarjee.
„ Veljee Bhimjee.
„ Jayram Devchand.
„ Devjee Khimjee.
„ Premjee Narayenjee.
„ Dharsi Khetsey.
„ Motiram Jadavjee.
„ Ramji Govindjee Sanju.
„ Madhavji Bhanji.
„ Karsandas Karamsi.
Mr. Madhavji Tejpal.
„ Dayal Laljee.
„ Jivraj Singhjee.
„ Lakhmidas Harbham.
„ Narayenji Haribhai Devsi.
„ Dossabhai Purushottum.
„ Govindjee Devjee.
„ Damodar Haribhai Bhanji.
„ Mavjee Liladhar.
„ Devjee Trikamdas.
„ Ratansi Govindjee.
„ Surji Kuvarjee.
„ Mulji Purushottum.
„ Ibjee Umarsey.
„ Dhanaji.
„ Jao Nakhva.
„ Lukmanji Submanji.

C WARD (SOUTH).

Market.

Section I.

Mr. G. N. Nadkarni.
„ V. G. Bhandarkar.
„ Narayen Keroba Bhende.
Mr. Anandrao N. Dabholkar.
„ Mukund S. Patkar.
Rao Saheb Ganpatrao M. Pitale.

Section II.

Rao Bahadur Dhakji Kashinath.
Dr. P. J. DeSouza.
Mr. G. M. Dukle.
„ Shamrao Pandurang.
Mr. Bapu Bhai Rele.
„ R. P. Kamat.
„ Shamrao Dinanath.
„ Balkrishna Bhawanishankar.

Section III.

Mr. Munshi Abdool Karim.
„ Soorufally Mamoojee.
„ Purushottum Narayanjee.
Mr. Jethabhai Anajee.
„ Pitambar Virjee.
„ Dawodbhoy Moosabhoy.

Section IV.

Mr. Govindjee Thakarsey Mooljee.
„ Harjivandas Soonderdas.
„ Harjivandas Bechar.
Mr. Morarji Ghela.
„ Devidas Vithaldas.

Section V.

Mr. Ishwardas Tribhovandas.
Mr. Narotam Morarji Gakuldas.

Section VI.

Mr. Nagindas Tribhovandas Master.
„ Purunmal Gooljee Singani.
Mr. Lukhmidas Pragjee Asher.

Section VII.

Khan Saheb Fakirji Jiwajee.
Dr. Bejanjee Dadabhai.
„ D. B. Master.
Mr. Nazarally Kamruddin.
Dr. Edalji Cawasji.
Mr. Purushottum Harilal Mohanlal.
„ Haji Ibrahim.
„ Haji Cassum Jusub.

Section VIII.

Mr. Manekchand Kapurchand.
„ Mohanlal Maganlal Jaweri.
Mr. Abhechand Kasturchand.
„ Harichand Toolaji.

PHANASWADI.

Section I.

Dr. A. G. Viegas.
Mr. Raoji V. Sankarsett.
„ Shantaram Khatre.
„ Vasantrao Nana Moroba.
Mr. Atmaram Jagannath Kirtikar.
„ J. Das Neves Menezes.
„ Sadanand L. Bhandare.
„ Bhikajee Ratanjee Rana.

Section II.

Mr. D. R. Chichgar.
„ Balkrishna Sadanand Desai.
„ Bhai Jiwanjee.
„ Nana Narayen Kothare.
Rev. A. Lisboa.
Mr. Umedram Girdharlal Dewan.
„ J. R. Dias.
Mr. P. Godinho.
„ Balkrishna Sadanand Kirtikar.
„ Nagindas P. Mody.
„ J. B. Gazdar.
„ Hormusji Sorabjee.
„ P. F. Khare.

Section III.

Mr. Narayen Raghunath.
„ Nanabhai Moroba.
„ Parbhudas Bhugwandas.
„ Sampatrao S. Chapwala.
„ D. V. Madgaokar.
Mr. Balaram Pandurang.
„ Makundrao Sakaram.
„ Ram Dutt Vithoba Desai.
„ Anandrao Harishankar.
„ Anandrao Vinayek.

Section IV.

Prof. Shankar Abaji Bhise.
Mr. I. S. Desai.
„ Trikamdas Pranjivandas.
„ Balkrishna Bhiwaji Nakwa.
„ Harichandra Kashinath.
„ Chintaman Atmaram Rele.
Mr. Govardhandas Motiram.
„ Kewasrao G. Desai.
„ Bhagwantrao Nanabhai Vagal.
„ Purushottum Bhai.
„ R. N. Dhairyawan.

DHOBI TALAO.

Section I.

Mr. G. N. Nadkarni.
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